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Revised Standards for Milk Products

THE SECRETARY OF AGRICULTURE has promulgated for the guidance of officials in the enforcement of the federal Food and Drugs Act revised standards for milk products adopted by the food standard committee, which is composed of three representatives each of the association of American dairy, food and drug officials, of the association of official agricultural chemists and of the department of agriculture. The revised standards and definitions are as follows:

1. Milk is the whole, fresh, clean, lacteal secretion obtained by the complete milking of one or more healthy cows, properly fed and kept, excluding that obtained within fifteen days before and five days after calving, or such longer period as may be necessary to render the milk practically colostrum free.

2. Pasteurized milk is milk that has been subjected to a temperature not lower than 145 degrees Fahrenheit for not less than thirty minutes, after which it is promptly cooled 50 degrees Fahrenheit, or lower.

3. Homogenized milk is milk that has been mechanically treated in such a manner as to alter its physical properties with particular reference to the condition and appearance of the fat globules.

4. Skimmed milk is milk from which substantially all the milk fat has been removed.

5. Buttermilk is the product that remains when fat is removed from milk or cream, sweet or sour, in the process of churning. It contains not less than 8.5 per cent of milk solids not fat.

6. Goat's milk, ewe's milk, etc., are the fresh, clean, lacteal secretions, free from colostrum, obtained by the complete milking of healthy animals other than cows, properly fed and kept, and conform in name to the species of animal from which they are obtained.

7. Evaporated milk is the product resulting from the evaporation of a considerable portion of the water from milk, or from milk with adjustment, if necessary, of the ratio of fat to nonfat solids by the addition of or by the abstraction of cream. It contains not less than 7.8 per cent of milk fat, nor less than 25.5 per cent of total milk solids; provided, however, that the sum of the percentages of milk fat and total milk solids be not less than 33.7 per cent.

8. Sweetened condensed milk is the product resulting from the evaporation of a considerable portion of the water from the whole, fresh, clean lacteal secretion obtained by the complete milking of one or more healthy cows, properly fed and kept, excluding that obtained within fifteen days before and ten days after calving, to which sugar (sucrose) has been added. It contains not less than 28 per cent of total milk solids, and not less than 8 per cent of milk fat.

9. Evaporated skimmed milk is the product resulting from the evaporation of a considerable portion of the water from skimmed milk, and contains not less than 20 per cent of milk solids.

10. Sweetened condensed skimmed milk is the product resulting from the evaporation of a considerable portion of

the water from skimmed milk to which sugar (sucrose) has been added. It contains not less than 24 per cent of milk solids.

11. Dried milk is the product resulting from the removal of water from milk, and contains not less than 26 per cent of milk fat, and not more than 5 per cent of moisture.

12. Dried skimmed milk is the product resulting from the removal of water from skimmed milk, and contains not more than 5 per cent of moisture.—Journal A. M. A.

TUBERCULOSIS VACCINATION

In February of this year Calmette and his associates told the French academy of their progress in vaccinating children and lower animals against tuberculosis.

Dr. Calmette is one of the oldest and most prominent of the students of Pasteur. Not only has he been a member of the Pasteur institute staff for a generation, but he was a worker there in the days when Pasteur himself was alive and active in the research carried on in the institute. In those early days Calmette took consumption in man and animals as his life work. All of his scientific life has been devoted to finding a method of vaccinating against tuberculosis.

The particular method he is now using he began working on just twenty-one years ago. Six years ago he was certain enough of his grounds to write a book on the subject. Since then he has reported progress at least twice a year. His method consists in growing virulent tubercle bacilli obtained from cows, on culture media which contains bile. After being grown on this medium for a long time the bacilli become incapable of causing tuberculosis, or of doing harm in any way. At the same time they are capable of immunizing animals against tuberculosis. The immunization can be done either by an injection, or by feeding the bacilli by mouth.

Calmette and Guerin and associates report that they have vaccinated 5,183 babies. Of these 1,317 were first vaccinated more than eighteen months before the report was made. These babies were of tuberculous mothers and lived in homes where the exposure to tuberculosis was constant. Only 2 per cent of them have developed tuberculosis. Twenty-four per cent of unvaccinated children under similar circumstances would have become tuberculous. The babies were vaccinated within the first few days of life. The vaccine was fed them in milk.

Details of the method of vaccinating are given in the Annals of the Pasteur institute for February, 1926. None of the babies were in any way harmed by the vaccination. Calmette says, so far as he can say now, vaccination should be repeated once a year, at least throughout the years of older childhood. However, experience with monkeys shows that vaccination once every three years is often enough with those animals. In time it may be found to be frequent enough with humans.

The vaccination of grown people is not advised unless possibly it be those who do not give a negative reaction with tuberculin.—Dr. W. A. Evans in the Chicago Daily Tribune.

HEALTHY ANIMALS DISLIKE TONICS

The medical profession and the veterinary medical profession are opposed, on general and scientific principles, to the administration of tonics to healthy people and animals. Such procedure is unscientific and in practice is always marked with failure. Farmers are giving of their hard-earned money for stock powders, condition powders, and shotgun prescriptions, in the vain hope that they will keep their animals healthy and cause them to make greater gains.

When an animal is sick, the disease should first be diagnosed, and then an appropriate treatment given with the hope and expectation of relief. When an animal is not sick he needs nothing but plenty of good feed and shelter. Giving

tonics with the expectation that nature can be coaxed to redoubled effort without paying the price later is a delusion and a snare. The law of compensation never fails: stimulation today means depression tomorrow. Tonics to healthy animals are worse than useless. They are a waste of money.

A balanced ration for animals is a very different matter. This means getting the maximum gains by such an adjustment of nutritive elements that nothing is wasted. My advice is to study balanced rations and forget the tonics.—Geo. H. Glover, Department of Veterinary Medicine, Colorado Agricultural College, in the Macon (Mo.) Republican.

FEWER TUBERCULOUS HOGS

With current progress in eradicating tuberculosis from cattle, a noticeable decline of the same disease among swine is taking place. This announcement by the Bureau of Animal Industry, United States Department of Agriculture, is based on field observations and by records of the Federal meat inspection service.

A striking example of the effect of the work has been received by the department from an Iowa packing company which has "kept books" on such losses for the last seven years. In 1919 the average loss per hog caused by tuberculous infection was 75 cents. This figure is the economic loss for hogs slaughtered in the plant. In 1920 the loss declined to 66 cents, in 1921 to 49 cents, and in 1922 to 32 cents. Since 1923 the loss has declined further to 26 cents.

"We have actual knowledge, through experience," the company adds, "that the tuberculin test applied to cattle has reduced bovine tuberculosis among cattle and hogs following them, and has cleaned up the hogs from the disease."

Further evidence is given by the packer's report for Hardin County, Iowa, which is an area accredited as free from bovine tuberculosis. During a 9-month's period more than 11,000 hogs were shipped from this county and slaughtered, with an average economic loss, caused by tuberculosis, of only 4.7 cents each. This figure is less than a fifth of the general average which in turn is about a third of

The above illustrates a common condition observed on many farms. Several of the swine are covered with mud, indicating a hog wallow is permitted or maintained on the premises. The pig on the extreme left is much smaller than the others, although practically the same age. Runts and unthriftiness are in many instances due to parasites that develop in hog wallows.

the loss in 1919 when systematic tuberculosis eradication was just begun.

An important development of the work is the discovery that throughout the Central West especially, many poultry flocks are tuberculous, and some infection among swine is traceable to that source. Fowl tuberculosis yields readily, however, to methods of control and eradication. Thus the outlook for the complete suppression of tuberculosis among all kinds of livestock is encouraging, Federal veterinary officials assert.

VETERINARIANS NECESSARY

Without thinking, the average man will say: "I thought the veterinarian had passed; there are no horses any more." Instead of passing, the veterinarian has become far more important a factor in industry than ever he was when the horse was king. By no means has the horse disappeared and there are evidences that he is coming back for many purposes. So the veterinarian has the horse yet to look after.

It has been discovered that among domestic animals as among humans, medical science can do much to prevent sickness and suffering. Veterinary medicine now is concerning itself with the diseases of animals for the purpose of discovering how to prevent them. To keep cattle, hogs, sheep healthy, to bring them through the feeding period, prepared for the market at good prices, furnishes an object for the modern practitioner.

The profession has been enlarging its field and vision. The diminution of the number of horses has not affected its outlook; on the contrary it has been compelled to find outlets for its service and it has succeeded.

Springfield (Ill.) Journal.

At the recent meeting of the British Association for the advancement of Science at Oxford, Sir Arnold Theiler of South Africa reported on cows from whose diet all vitamins had been extracted, but the animals thrived when supplied with phosphorus.

AVIAN TUBERCULOSIS CAUSING GREAT LOSSES

Recently pathologists of the United States Department of Agriculture examined the glands taken from 319 tuberculous hogs which had originated in modified accredited areas—areas in which bovine tuberculosis had been practically eradicated. The organism was not found in all glands, but of the 136 in which tubercle bacilli were found, 60 were infected with the bovine type, 45 with the avian type, and 31 with both types.

Such facts as these demonstrate that the avian type is causing many retentions of hogs from modified accredited areas, says Dr. J. A. Kiernan, of the Bureau of Animal Industry, in charge of tuberculosis eradication. This fact should stimulate a greater activity against the disease in poultry flocks, he says. Avian tuberculosis exists only to a limited degree in the Eastern and Southern States, but it is causing great losses in the Middle Western or Corn Belt States. In fact, in many counties in the Corn Belt, it may be causing greater financial losses than bovine tuberculosis, and there is every reason to believe that it is spreading rapidly.

The field force, in its regular work with cattle during the past 15 months, has inspected 202,538 poultry flocks, of which 12,301 flocks, or 6.1 per cent, were found to be infected with tuberculosis. More than 16,450,000 fowls were included in the flocks inspected. This survey included work in those States known to have only a light infection as well as those known to be extensively infected.

The best method of combating avian tuberculosis may or may not have been worked out, says Doctor Kiernan, but that fact should not prevent proceeding with the present method until a better one has been devised. Where infected flocks are found the owner is urged to dispose of the entire flock, thoroughly clean and disinfect the premises, and before reestablishing a flock move the quarters to a new location if possible.

Demodectic mange has been identified in a Toggenburg goat at Rochester, Minn.

Purebred sires are used by 96.5% of 4212 dairymen located in 56 different counties in Wisconsin.

Arteriosclerosis occurs in domestic animals. The condition is not as prevalent in these animals as in the human probably because of the relatively shorter life of domestic animals.

It has been estimated that the center of the sun has a temperature of seventy million degrees Fahrenheit, which should be sufficient for all sterilization purposes.

Chemiluminescence is the name of a new kind of light produced by chemical action in which there is no combustion. This form of light is composed only of one color and does not contain all the colors of the spectrum. It may be of value in certain technical surgical tests.

That coyotes are susceptible to tularemia infection has been demonstrated by Parker and Francis of the U. S. Public Health Service. They point out the possibility of human infection from this source, also that tularemia may be a factor in the decrease of coyotes noted where there is a marked death of rabbits in the same localities.

Photo by Dr. S. B. Manning, David City, Nebr., who states this picture shows the youngest broke team on record, the colts being three weeks old. The driver is two years old. His brother, twelve years old, broke them.

Plans for repelling invasions of foreign livestock diseases were formulated in Washington during the first week in August by a joint conference of Mexican and United States officials. The Mexican delegation was composed of Dr. Antonio Castro-Leal, Charge d'Affaires of the Mexican Embassy; Dr. Jose Figueroa, Chief of Cattle Division in the Mexican Department of Agriculture; and Dr. Daniel Ortiz Berumen, in charge of the section dealing with disease-control measures. The United States representatives were Dr. John R. Mohler, Chief of the Bureau of Animal Industry, United States Department of Agriculture; Dr. A. W. Miller, Chief of the Field Inspection Division of that bureau; and R. W. Flournoy, of the State Department. The constant menace of numerous foreign livestock diseases and the mutual interest of Mexico and the United States in combating them by effective and uniform measures were the occasion for the conference.

The honeycomb from a bee hive in which foul brood occurs may be sterilized by a solution of soap, water and formalin.

Giant cells in the blood are caused by the fusion of a number of white blood cells, according to researches of Dr. W. H. Lewis of the Carnegie Institution.

A diagnostic skin test for infantile paralysis has been discovered by Dr. Edward C. Rosenow of the Mayo Foundation. As yet no antitoxin for the disease has been developed.

Angora goats live longer and have a longer productive period than their farm cousin, the sheep. One 22-year-old Angora buck is in service this year. The usual life span of the Angora doe is from 12 to 15 years.

Artificially induced malarial fever is one of the most modern methods of treating paralysis and insanity, though the curative effect of fevers on mental disorders was known to such ancient healers as Hippocrates and Galen.

Over one billion dollars is expended annually in the United States for drugs, doctor bills and hospital service. Approximately one-half of the total is spent for patent medicine and one-fifth for medical service.

The fact that some pathogenic bacteria remain dormant for a time after introduction into the animal body may indicate resistance on the part of the infected animal or lack of adaptability of the infecting microbes.

Encouraging results have been obtained by the use of serum from humans that have recovered from the bite of a species of poisonous spider known as the "black widow" in the treatment of individuals that have been bitten by such spiders.

"Haff sickness" prevalent among German fishermen in the Baltic has been found due to factory wastes containing arsenic compounds altered into gaseous form by small organisms in the water. Control of the disposal of the waste products is reported to have eliminated the disease.

An interesting case of ovine tuberculosis was reported by Griffith in the Journal of Pathology and Therapeutics. The tubercle bacilli in this case exhibited pathogenic properties of the avian type while culturally and serologically they resembled the mammalian type.

Tuberculin contains a protein that has been crystallized and found to produce a cutaneous reaction. This may lead the way to the production and use of a purified crystalline tuberculin, which may possibly eliminate some of the difficulties now encountered in tuberculin testing.

Ferric chlorid is a reliable preventive and curative agent for ivy poisoning. A solution containing one part by weight of ferric chlorid with ten each of alcohol and water and used as a wash before and after contact or exposure to the poison ivy, will usually prevent any ill effects. Other soluble iron salts are also of value in neutralizing the poisonous substance of poison ivy.

Poisoning due to destruction of red blood corpuscles and the formation of methemoglobin may be caused in the human by use of certain shoe dyes. The toxic ingredients of the dye may be nitrobenzine, anilin or some of its derivatives. No doubt a similar condition may occur in pets such as cats and dogs because the poisonous substances do not all evaporate for probably 72 hours after the dye is applied.

Some Swine Problems

A. T. KINSLEY, Kansas City, Mo.

HOG CHOLERA was the principal and practically the only disease that concerned the breeder and feeder of swine prior to about 1910. The advent of anti-hog-cholera serum and the successful control of cholera not only increased swine production, but also stimulated veterinarians in rural communities to familiarize themselves with swine disease. Since cholera has been controlled it has been found that there is a variety of other diseases of swine that requires constant vigilance to prevent excessive losses. The following extracts from inquiries received from veterinarians in different sections of the country are indicative of the various ailments and problems that arise in swine practice.

Report No. 1

"Owner had about 250 pigs six weeks ago. Several were affected, a few died and many showed marked emaciation. Because of the presence of ascarids, revealed on autopsy, a vermifuge was administered to all the remaining pigs. The losses continued and a slop feed alkalined with lye was provided but without favorable results. The symptoms and lesions observed at this time (six weeks after the disease first appeared, there were only 150 pigs left) were as follows:

"Symptoms: Marked emaciation, diarrhea in few cases only, some coughing, nasal discharge, thumping, appetite fair, temperature 103-104°F, some evidence of icterus, and in a few cases there was slight reddening of the skin of the abdomen.

"Lesions: Some petechiæ on visceral pleura, bronchial and mediastinal lymph glands slightly congested, intestinal mucosa inflamed and in some cases there were caseated deposits on the mucosa of the small intestine.

"Two of these pigs were subjected to a laboratory examination with the following findings: pneumonia due to larval ascarids, enteritis probably due to infection with B.suipestifer, arthritis probably due to infection in utero or at the time of farrowing, and an affection of the nasal mucosa that will probably terminate in bull nose.

"Suggestions as to methods of control will be appreciated."

H. C. P., Nebraska.

Report No. 2

"Information relative to the following described swine troubles will be appreciated.

"History: Two lots of hogs on the same farm in adjacent lots separated by a wire fence only. The hogs in one lot weighed about 175 pounds, and those in the other lot 40 to 90 pounds.

"The smaller pigs were castrated and weaned about one month ago, and they and the larger hogs were apparently healthy at that time. None of these swine had been immunized with serum and virus. A few days after castrating the smaller swine, seven of the larger swine were reported off feed. An investigation was made and the following conditions found:

"Symptoms: In the beginning a few of the swine in both lots coughed almost continuously especially when they were forced to move, showing also inappetence, gauntness, rapid breathing, and some thumping, tendency to constipation, temperature 105-107°F. A few of the affected swine would sit on their haunches like a dog and some of them would drag their hindquarters. Two of the larger hogs died.

"At this time a soaked oat diet to which had been added some copper sulphate was provided. All swine in both lots were given mixed infection bacterin (swine). The results from the prescribed treatment were not satisfactory and a pig was forwarded to a laboratory for examination and in due time received the following report and recommendations: 'Gastric, intestinal, renal and cystic hemorrahages, lymph glands congested

and hemorrhagic, use anti-hog-cholera serum and virus!'

"I was skeptical about the laboratory diagnosis and prescribed muco-septone in feed and treated all remaining swine with mixed scour bacterin (swine) without results. A few days later over 50% of the smaller swine had high temperatures, ranging from 104 to 107°F., and several of them were eliminating blood in their urine and feces and a few had diarrhea. At this time, about four weeks after the disease first appeared, anti-hog-cholera serum was administered to the small swine and within a day or two they were apparently recovering.

"Of these swine, 40 weighing about 175 pounds and 80 weighing from 40 to 90 pounds, twenty-seven died, seven large and twenty small. The two lots of swine were separated by a wire fence. Both lots were provided the same ration. The larger swine were treated with bacterin only, the smaller swine with bacterin and anti-hog-cholera serum. What was the disease? Is it possible that cholera virus will not be spread from cholera swine on a farm where numerous barnyard fowls are running at large? H.A.P., Mo."

A discussion of the two above reports from readers of Veterinary Medicine will be appreciated. Other similar reports will follow.

Bovine Infectious Abortion*

(Report of Committee, U. S. Live Stock Sanitary Association, December 1925. C. P. Fitch, Chairman)

EACH YEAR SINCE 1917 your committee on abortion has presented its report. As stated in the original motion made and passed by this association at its twentieth annual meeting, it is the function of this committee "to draw up a compilation of all established facts concerning abortion disease and they shall recommend measures which have been found most effective in combating the disease under certain conditions." A study of the reports presented for the past eight years shows that the first mandate has been carried out. The recommendations as to the control of the disease have been very meager. Your committee in 1918 made a definite recommendation that "bovine infectious abortion is a dangerous communicable disease of cattle, due to a specific germ, B. abortus (Bang) and that hereafter it shall be considered as such and as coming within the meaning of the laws or regulations of the states having general or special laws or regulations covering the handling of contagious diseases of live stock, and that in other states, laws or regulations should be forthwith adopted to bring the disease under official cognizance." After a prolonged and heated discussion the association voted to refer this report back to the committee for further consideration. Each committee since has made certain recommendations, largely however, relating to the educational policy in respect to the disease, and little has been presented as to control.

The past seven years have been productive of many additional facts in respect to our knowledge of bovine infectious abortion. Additional germs have been described which cause abortion as mucors and Vibrio fetus, but none have been shown to be widespread and common causative factors. Experiments in the field of nutrition have demonstrated that deficient rations in certain species of animals may cause difficult conception and in some cases actually produce abortion. Researches have not shown that nutritional disturbances are important factors in the production of abortion among cattle. Investigators have shown that the disease due to Bact. abortus (Bang) is widespread and causes enormous economic losses. The problem before this association

* From Proceedings of the Twenty-ninth Annual Meeting of the U. S. Live Stock Sanitary Association, held at Chicago, December 2-4, 1925.

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is not how shall veterinary practitioners treat cases of sterility or diseases of young calves, and as a regulatory body we are not primarily concerned with these conditions, brought about in cattle by the pyogenic group of bacteria. What we are so vitally interested in is Bact. abortus (Bang) and the animals which have this organism in their bodies. It is the belief of your committee after a careful study of the papers on abortion presented before this association for the past eight years, and the following discussions, that the importance of the Bang organism as a disease producer has not been sufficiently taken into account by the sanitary officers of many of our states. Your committee this year wishes to emphasize once more the importance of Bact. abortus (Bang) as the cause of one of the most serious diseases affecting the cattle industry of the United States. Those live stock sanitary officials who persist in ignoring this organism as a cause of disease and fail to institute measures tending toward the control of animals infected with and eliminating this organism from their bodies are not doing their full duty. This attitude will react unfavorably on the cattle breeding industry of the whole country in future years.

Immediately we hear "Why don't you formulate a plan for the control of this infection and present it to us for consideration?" Please do not be too hasty in your judgment. Let us see if such a procedure is feasible.

Bovine tuberculosis has been present in this country for many years. After the discovery of tuberculin and its effectiveness as a diagnostic agent in the early nineties, various states took up the problem of the control of this disease. Conditions in the different commonwealths varied greatly and no two states worked under exactly the same plan. Some states made a great deal more progress than others. It was not until 1917, more than twenty years later, that the accredited herd plan for the control of bovine tuberculosis was adopted by this organization. Since this later date many changes have been injected into the original scheme, and other plans, notably the "area plan," have been initiated. All the states have fallen into line and are now proceeding with the control of bovine tuberculosis in a nearly uniform manner. This, however, has been brought about after 30 years of individual effort on the part of each state and further has been made possible only after a tremendous educational campaign by all interested parties. Education of the people to the importance of control measures is the basis of success in combating any contagious disease. Education must precede regulation.

England has pursued the policy of letting bovine tuberculosis largely look after itself. What has been the result? According to statements published in the British Isles, it is estimated that approximately fifty per cent of the cattle of that area will react to the tuberculin test. Just lately an order has gone into effect which will aid in the suppression of the disease in that country. The principal part of the act relates to the disposal of "wasters" or physical cases of tuberculosis and to cases of tuberculosis of the udder. No general application of the tuberculin test is provided. In other words, the plan in operation in this country for the control of bovine tuberculosis is not deemed suitable for conditions in Great Britain. We cite these facts in regard to tuberculosis to illustrate our stand that (1) it is not yet feasible to put into effect a general plan to control bovine infectious abortion and (2) to illustrate what happens when a country or state makes little effort to control an infectious disease. It is time that every state here or elsewhere represented, should consider the ravages of bovine infectious abortion and institute some control measures, taking into account the known facts concerning the disease and such measures should be applicable to the conditions of the cattle industry in the respective commonwealth. Your committee stands ready and willing to offer advice and to aid in any way possible any live stock sanitary official who desires help in formulating measures for the control of the malady. It should be kept in mind that when the committee on abortion was established, they were charged with "recommending measures which have been found

most effective in combating the disease under certain conditions."

Some states have already made a start. Georgia, South Carolina and most recently Arkansas, have regulations requiring a health certificate for all animals imported into their domains. Pennsylvania has a plan for the control of bovine infectious abortion. A few other states have some form of regulation. In most of these latter cases the regulations are overlooked or not enforced. The great majority of states do not have any plan for the control of this disease.

The time has come we believe when a concentrated effort should be made in all the states of this Union to reduce the losses resulting from bovine infectious abortion. It is absolutely not feasible to attempt at the present time to adopt a uniform plan for the control of this infection. We believe that sometime in the future it will be possible to formulate and place in effect a uniform method for the control of this disease, but at the present time each state should work out its own system, which is most adaptable to its particular conditions. The point we wish to emphasize most is, that now we should take some official cognizance of bovine infectious abortion, and further that this should be done by educational or control measures, which are really active and not merely so many meaningless words or phrases, which are as dead as the paper upon which they are written.

This year throughout this country, there will be spent in excess of $12,000,000 for the control of bovine tuberculosis. This money is being furnished by the taxpayers and because they really believe the work is worth while and is yielding results which more than compensate for the enormous cost. The suppression of foot-and-mouth disease has likewise cost many millions of dollars, yet the money has been wisely spent and its value returned many fold to the animal industry of the United States. It costs money and sometimes large sums to properly control an infectious disease.

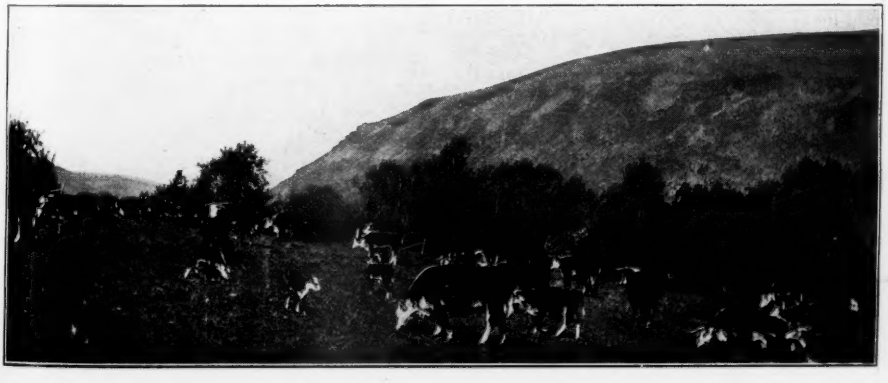
One of the reasons for the liberal support given to the eradication of bovine tuberculosis is its definite relation to human health. Any disease transmissible from animals to man receives a great deal of attention. For many years it was believed that bovine infectious abortion had no relation to the health of man. Recently researches have shown that bovine infectious abortion may have connection with human welfare. Alice C. Evans of the Public Health Laboratory was the first to show that Bact. abortus (Bang) was very closely related if not identical with Mic. melitensis, the cause of Malta fever. Malta or undulant fever is primarily a disease of goats which is transmissible to man, and a number of cases have been described in this country, especially by Lake of the Public Health Service. You will probably remember Dr. W. A. Stephenson, late State Veterinarian of Utah, who died in 1923 of Malta fever contracted from goats. The work of Evans on the close relationship of the germ causing abortion of cattle, and that of Malta fever, has been amply confirmed by Myer and his associates in this country; by Burnet in Algiers; Khaled in Egypt; Orpen and Bevan in Rhodesia; Dargein and Plazy in France; and Rebagliati and Vaccaro in Italy. The carefully studied case reported by Keefer of Johns Hopkins Hospital, shows conclusively that an organism which cannot be differentiated from that which causes abortion in cattle, may produce disease of man. Thirty-five cases of human disease produced by the abortus variety of the melitensis organism, have been reported from South Africa. In an unpublished report, Carpenter of Cornell describes a case of disease in man caused by an organism which cannot be distinguished from Brucella melitensis. Carpenter produced abortion in a pregnant cow with the culture obtained from the human subject. He also obtained the abortion germ by bacteriological examination including animal inoculation from nearly every sample of milk from the dairy supplying it to this individual. Evans reports a case of human disease due to the abortus type in Virginia. This individual was in the habit of drinking raw cow's milk, but the source of the infection was not definitely established. There have been sent to Evans at the Public Health

Laboratory at Washington for identification strains of the abortus type, isolated from human cases of Malta fever, from South Dakota, Connecticut, California and Utah. The histories of these cases exclude infection from goats. It is quite apparent that there is some relation between bovine infectious abortion and human health. As was pointed out in an editorial in the Journal of the American Medical Association, "The fact appears to be established that the agent of contagious abortion may infect man."

The efficient control of an infectious disease depends to a large extent upon a reliable method of diagnosis. This is particularly true in respect to diseases in which the "carrier" problem takes an important place. The diagnostic use of tuberculin is the keystone in the arch of tuberculosis control. McFadyean and Stockman in England and Holth and Wall in Denmark in 1908 and '09 were the first to point out the value of the agglutination and complement fixation tests in the diagnosis of bovine infectious abortion. Since this date many investigators have published reports of their studies of application of these tests. During the past year, members of your committee have been studying the sera reactions for bovine infectious abortion. We have demonstrated several very important technical features in connection with both tests. The degree of concentration of the test fluid in the agglutination method is very important. The individual equation in reading the test as always must be considered. We have determined that under routine conditions the agglutination test is superior to the complement fixation, because it is less complicated and is not affected by so many factors. Under certain conditions as a check test on doubtful or suspicious animals and in the incubative stages of the diseases, the complement fixation test is particularly valuable.

We desire to emphasize that the sera reactions for bovine infectious abortion are reliable. True they do have certain weaknesses but that can be said about any biological test. The greater extent to which they are being used by practitioners as pointed out by your committee last year, is an indication of their worth, and also the breeders appreciate their value and are requesting that their herds be tested.

We desire in conclusion to recommend two things: (1) That this association take official cognizance of bovine infectious abortion, as an infectious disease of animals, and (2) That the live stock sanitary authorities of each state study the situation in respect to this disease in their particular commonwealths, and initiate such control measures as they consider advisable and further that such authorities be prepared to report to this association next year the progress which has been made.



Somnifene, a Hypnotic*

ARMAND TAPERNOUX, Department of Chemistry, l'Ecole Veterinaire de LYON

UNDER THE DESIGNATION of hypnotics are assembled drugs of different chemical compositions which possess in common the power of producing drowsiness and sleep. These drugs evidently act upon the central nervous system, temporarily arresting certain functions, which condition if long continued, would produce death.

The word hypnotic should be limited in application; all drugs capable of producing sleep are not hypnotics; general anesthetics produce sleep but only as a secondary action.

Kaufmann differentiates hypnotics from general anesthetics from the fact that the first conserves most of the reflexes, while the second abolishes most of them. This differentiation is not satisfactory. It is evident, however, that a clear line of demarcation cannot be drawn between hypnotics and anesthetics.

One can say that general anesthetics produce sudden sleep, with a shocking of the organism which is more violent as the anesthetic is pushed, and that rapid functional changes are produced which become general if the administration of the anesthetic is not stopped.

The therapeutic dosage of general anesthetics is close to the toxic limits, which explains the accidents of anesthesia.

Hypnotics, on the contrary, act with less violence; the action resembles that of general anesthetics but is slower and much more prolonged. Hypnotics resemble dilute anesthetics.

The anesthetic action of ether $(C_2H_5)_2O$ is due to the radical C_2H_5 which is also found in ethyl chlorid, C_2H_5Cl, and alcohol, C_2H_5OH, this explaining their intoxicating and hypnotic properties. The radical C_2H_5 is also found in certain hypnotics; sulfonal, veronal, urethane.

The ethyl radical is not however the sole alcoholic residue possessing hypnotic properties; the methyl radical CH_3, propyl CH_3-CH_2-CH_2, isopropyl $(CH_3)_2CH$, allyl CH_2-CH=CH are also hypnotics.

The methyl radical is found in chloroform, $CHCl_3$, and bromoform, $CHBr_3$, also in sulphonal:

$$\begin{matrix} CH_3 \\ CH_3 \end{matrix} > C < \begin{matrix} SO_2\text{-}C_2H_5 \\ SO_2\text{-}C_2H_5 \end{matrix}$$

and in paraldehyd $(CH_3\text{-}CHO)_3$ where it is found united to the aldehydic group.

In these again one notices the relation between general anesthetics and hypnotics.

The radicals which will be taken up belong to the fats, but the aromatic compounds furnish the phenyl radical C_6H_5 which is found in acetophenone and in certain hypnotics of the ureids. Unfortunately this radical renders the compounds toxic and limits their usefulness.

As a result of pharmacodynamic research the radical C_2H_5 is found to be the most efficacious and to be least dangerous to the organism.

The action of hypnotics is more prolonged than that of general anesthetics. This can be explained as follows: Sleep is physiologically explained by the retraction of the protoplasmic prolongations of the nerve cells, which isolate each neuron and inhibit the action of the central nervous system. To reproduce this physiological action it is necessary that the drug come in contact with the nerve cells. The hypnotic group in both hypnotics and general anesthetics is carried by the blood, but in the latter case it is not fixed by the nerve cells because it lacks the fixing power possessed by the hypnotics. This is why it is necessary to continue the administration of a general

*Translated from the French by Captain A. C. Wight, V. C., 12th Field Artillery, Fort Sam Houston, Texas.

anesthetic and is also why anesthesia ceases soon after the anesthetic is removed.

The fixation groups play a great role in therapeutics. Some have thought that the action of a drug depends upon the presence of a specific group. Among these groups perhaps the most important is the radical NH_2. It is believed that albuminoids are reduced in the intestines to amino acids, and that consequently they possess the power of fixation with the cells of the organism. Robin and Bouilhon have endeavored to maintain N equilibrium in animals by exhibiting a substance resulting from the action of ammonia on glycocoll. Efforts have been made to reconcile the active radicals with NH_2. However, all other than the active radicals can be combined with NH_2, for example the antipyretic radicals, as follows:

$$C_6H_4 < \begin{matrix} CO\text{-}NH_2 \\ NH\text{-}NH\text{-}CO\text{-}NH_2 \end{matrix}$$

The identity of action between general anesthetics and hypnotics is so evident that physiologists utilize chloral and a hypnotic combined with the volatile anesthetics.

The hypnotic groups are fairly numerous which explains the number of drugs with hypnotic action although all drugs that produce sleep cannot be considered as of therapeutic importance. It is necessary above all that they should not be toxic or that the toxic dose be as far removed as possible from the therapeutic dose. Moreover, the chemical combinations should be loose enough so that the hypnotic group is liberated in the body, but still sufficiently resistant to oxidation so as to arrive intact at the nerve cells. Finally, the dissociation of the radicals should not produce toxic products.

Hypnotics have been classified along different lines. Classification according to therapeutic action is the least precise. Some classify according to the ethyl radical. Fourneau classifies as follows:

1. Hypnotics of the alkaloid group: opium and morphin.
2. Hypnotics of the aldehyd group: paraldehyd, chloral, and its derivatives.
3. Hypnotics of the ketone group: sulphonal and acetophenone.
4. Hypnotics of the tertiary alcohol group: amyl hydrate.
5. Hypnotics of the acid amids: urethane, hedonal.
6. Hypnotics of the ureids.

The last group will be considered here.

Ureids are compounds derived from urea by the substitution of acid residues for one or more of the hydrogen atoms. One urea residue takes the place of the two acid hydroxyls according to the general formula R-CO.

The product obtained, $CO < \begin{matrix} NH\text{-}CO\text{-}R \\ NH_2 \end{matrix}$ for example, is a ureid. In combining one urea residue with one molecule of malonic acid, $COOH\text{-}CH_2\text{-}COOH$, barbituric acid is formed:

$$CO < \begin{matrix} NH\text{-}CO \\ NH\text{-}CO \end{matrix} > C < \begin{matrix} H \\ H \end{matrix}$$

This acid, like urea and malonic acid, is not hypnotic but it has two H atoms replaceable by hypnotic radicals. The substitution of two ethyl radicals gives us veronal or diethylbarbituric acid:

$$CO < \begin{matrix} NH\text{-}CO \\ NH\text{-}CO \end{matrix} > C < \begin{matrix} C_2H_5 \\ C_2H_5 \end{matrix}$$

These are colorless, odorless, slightly bitter crystals which are soluble in 145 parts of cold water. Veronal is a powerful hypnotic but induces nausea and vomiting and so is toxic. The insolubility retards elimination and awakening is slow and disagreeable.

If the ethyl radical is replaced by others results are as follows:

With the propyl radical—proponal.

With the allyl radical—dial.

With the ethyl radical and a phenyl radical—luminal.

All of these compounds are relatively insoluble so they have been combined with bases which would increase solubility and facilitate elimination. Sodium has been tried but the salts of sodium dissociate too rapidly by cyclolysis and lose their hypnotic properties. With a

more feeble base, diethylamin, Th. Redonnet has obtained diethyl barbiturate of diethylamin:

$$C<\begin{matrix}NH\text{-}CO\\N=C\end{matrix}>C<\begin{matrix}C_2H_5\\C_2H_5\end{matrix}$$

$$O\text{-}N<\begin{matrix}C_2H_5\\C_2H_5\end{matrix}$$

the diallylbarbiturate of diethylamin, and phenylethylbarbiturate of diethylamin.

Somnifene was first produced by preparing a solution of a mixture of diethyl and diallylbarbiturate and diethylamin but experiments showed that the allyl radical increased the toxicity of the product so this group has been replaced by the isopropyl group.

The phenyl radical was abandoned because of the toxicity.

Today, the somnifene of Hoffman-La-Roche, Paris, is prepared by making a saturated aqueous solution of equal parts of diethylbarbiturate of diethylamin and isopropylbarbiturate of diethylamin. Each cubic centimeter contains 25 cmgs. as follows: 0.10 diethyl acid; 0.10 isopropyl acid; 0.05 diethylamin. It is a yellowish liquid, oily to the touch, with a characteristic odor somewhat like cat urine, and bitter but not disagreeable.

This hypnotic has been much used in human medicine. It can be given by way of mouth, rectum, intramuscularly, or intravenously. The standard solution is used for intramuscular or intravenous injection but for oral or rectal administration it must be diluted.

The Use of the X-Ray in Small Animal Practice

K. K. SMITH, X-Ray Technician, Horning-McKee Clinic, Houston, Texas

IN ROENTGENOGRAPHIC WORK exclusively on small animals it is entirely practical to have the tube stand attached to the table on which the subject is placed.

Two positions for the tube stand will generally be found sufficient. One position directly above the surface of the table with the target of the tube so adjusted as to throw the penetrating rays directly downward—this position is used for skiagraphic work; and the other position directly under the surface of the table with the target of the tube so adjusted as to throw the penetrating rays directly upward—this position being used for fluoroscopic work. The stand in both positions is so arranged as to permit its being raised and lowered to bring it closer or farther from the subject.

In small animal work it has been found necessary to design a special table. This table should have a flat surface sufficiently large to accomodate the various subjects in the various positions necessary for the work, and should be from thirty-six to forty inches in height. The surface of the table should be covered with sheet lead and this in turn covered with a thin layer of wood veneer to protect the lead surface and keep it from becoming scratched.

For small animals it will be found that plates 11x14 inches will be the largest necessary and for most work much smaller plates may be used.

About twenty inches from one end of the table and centered laterally should be a hole approximately a foot square with the edges beveled to permit its being closed with various covers made for this purpose. One of these covers should be of the same construction as the surface of the table and is used in position when the tube is above the table for skiagraphic work. The other covers are made to present the same general appearance from the surface but are constructed with apertures in the center closed only with a thin layer of fiber or pasteboard. These

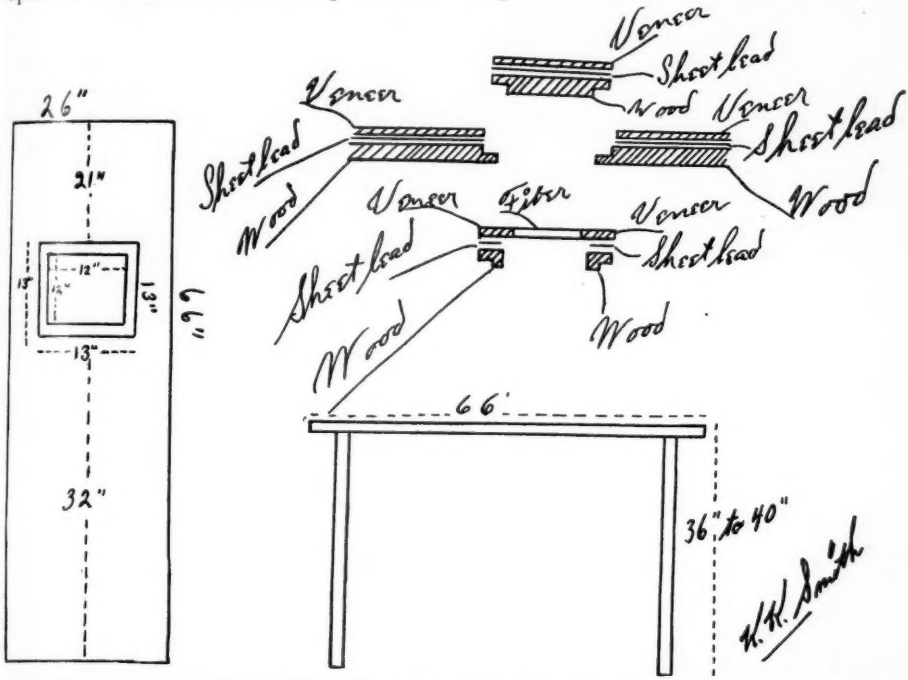
apertures should be of varying sizes from three inches square up to a size nearly equal to that of the cover. Of course, it is realized that each different size aperture found necessary will necessitate a different cover, as these covers are built to accommodate but one aperture. These covers with the apertures of the different sizes are used for fluoroscopic work with the tube mounted in the stand under the surface of the table and the target so adjusted that the penetrating rays strike the surface of the aperture at a ninety degree angle.

Suitable clamps or other arrangements are to be fastened along the edges of the table to hold the subject in position.

The illustration shown herewith gives the dimensions of the table used by the Horning-McKee Clinic, and shows the details of its construction. The stand, tube, and clamps for holding the subject in position are not shown as they would only complicate the drawing, and the idea is to show clearly the construction of the table.

It will be found that small animals can best be examined fluoroscopically on a flat surface and for that reason the rays must emanate from a source directly below. The target of the tube must be so adjusted that the penetrating rays strike the aperture mortised into the cover as before described at an angle of ninety degrees. With the subject fixed in position on the table with the part to be examined directly over the aperture, the fluoroscopic examination becomes a simple matter.

For plate work the tube is placed directly above the table, which is closed by the use of the cover containing no aperture. The target should be so adjusted that the penetrating rays will fall on the surface of the cover at an angle of ninety degrees. The subject should be placed in position on the table with the part to be skiagraphed directly



Make-up and construction of table. The space between the layers comprising the surface of the table is exaggerated in the drawing for the purpose of showing the construction. In reality there is no space between these layers, but they are fastened directly together.

over the cover. The plate may then be placed in position and the exposure made.

If for any reason it becomes desirable to obtain a skiagraph when the tube is in position below the surface of the table, it may be done by holding the plate in position against the subject, on top, and directly over the aperture. A lead backed plate or exposure holder should be used for this purpose.

In skiagraphic work always make it a point to place the plate holder in the same relative position. Then when the plate is removed from the holder and before development a mark of identification may be placed in the upper left corner. In case film is being used a small hole can be punched in the margin with a card punch. This will avoid any question as to which is the top or bottom, or the right or left side of the plate.

The tube when in use should be surrounded with a lead screen with the exception of that part from which the penetrating rays are emanating. Lead diaphragms of various sizes should be used on the active side of the tube to insure further protection against the detrimental effects of the ray.

Various authorities appear to be unanimously positive that it is the individual primarily and not the equipment that produces the results. This is another way of stating that practice makes perfect and that after all experience is the best teacher.

In a later article an endeavor will be made to enter somewhat into detail as to length of exposures, distances, and amount of current. Also photographs will be shown of subjects in various positions on the table, and photographic reproductions of skiagraphs taken during regular clinic work.

In 1843 Chicago passed an ordinance prohibiting hogs from running loose in the streets.

Rocky Mountain spotted fever is caused by an ultramicroscopic virus that will not pass through Berkefeld filters that will permit of the passage of Staphylococcus aureus. The virus occurs in the blood of affected humans and a tick is the intermediate host or at least the carrier.

Smallpox vaccination has been required of all entrants of the University of California (Berkeley) since 1907, and during that time there has not been a case of smallpox in the student body. This is a splendid record indicating the value of preventive medicine.

Two hundred cases of typhus fever have occurred in Alabama and Georgia in the last three years, according to the U. S. Public Health Service. The causative organism appears identical with that responsible for the disease in Europe and Asia, but the malady in this country has been of a mild form, and is not believed to have been transmitted by the body louse, the carrier of the pest in other parts of the world.

In some quarters it has been suggested that the geologic periods, Eocene, Oligocene, Miocene, Pliocene and Pleistocene, should be followed by the term Obscene designating the present era as reflected by the modern novel. Others have proposed the term Psychozoic as applicable to the age in which man dominates. Prof. E. W. Berry of Johns Hopkins University writing in "Science" disapproves of such a name, however, and says: "No one would probably gainsay the magnitude and multiferous effects of human activity, but these are scarcely of geologic magnitude, and I can conceive of many past events as being of much greater importance than the advent of man, if viewed with a certain degree of detachment."

Losses of Pigs Due to Arthritis

A. T. KINSLEY, Kansas City, Mo.

PYEMIC ARTHRITIS, navel ill or omphalophletbitis is an acute infectious disease of recently farrowed pigs characterized by inflammation of the umbilical tissue and suppurative arthritis. This disease has been more or less prevalent for ages. It is more prevalent some years than in other years. A large percentage of pigs may succumb to this malady in certain communities every year and other communities may be relatively free of the disease. Males and females of any and all breeds are apparently equally susceptible to this disease. This affection is most common in the spring farrowed pigs.

Cause

Pyemic arthritis is primarily an infection, but the specific exciting cause has not been identified. Pyogenic cocci have been isolated, in some cases in pure culture and in other cases in various combinations, and may have been the primary cause in those cases. The B. pyocyaneus and the colon bacillus have been identified in some cases and it is probable that other microbian agents may be factors in the occurrence of this disease. It is generally conceded that the infection causing pyemic arthritis in pigs may be, and probably in the majority of cases is, transmitted from the sow to the pig in the uterus. Infections of the uterus in sows that are not sufficiently virile to produce abortion are relatively common and in such cases pyemic arthritis is of common occurrence in the pigs soon after farrowing. No doubt the recently farrowed pigs that are kept in filthy quarters will be predisposed to this malady.

The infection of pigs in utero is direct from the diseased uterus through the placental membranes to the pig. In post-farrowing infections the microbian agent probably gains entrance through the thrombi in the umbilical vessels. By growth in continuity the infective agent would ultimately reach the blood stream and be carried to all parts of the body.

Symptoms

The symptoms usually become manifest within one week after farrowing although in some cases there may be no evidence of disease until the pigs are two or three weeks of age. Usually the initial symptom is lameness and an indisposition on the part of the affected pig to move. On examination one or more joints are found to be swollen and sensitive. The tarsal joints are most frequently involved. As the disease progresses, and usually within 12 to 24 hours after the lameness has been noted, diarrhea may become evident. This disease usually terminates fatally within two or three days after the onset.

Autopsy Findings

The lesions of pyemic arthritis vary according to the type of infecting micro-organisms and their location in the body. The typical lesions consist of omphalitis and suppurative arthritis. The inflammation of the umbilical vessels may be suppurative or non-suppurative and there may or may not be abscess formation. The lesions of the joints may consist of a mild synovitis with limited or extensive infiltration and tumefaction of the synovial membrane. In other cases the synovial membrane will be distended with accumulated pus. If the disease was prolonged there will probably be metastatic abscess in various organs such as the liver and spleen. In those cases in which the infection extended to the bladder there will be cystitis probably suppurative in character.

Treatment

Curative treatment is not as a rule satisfactory. Some practitioners have reported the successful treatment of some cases by the use of blood serum obtained from the tail of the sow, and injecting about 10 cc. into the muscle or the peritoneal cavity of

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Treatment

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the pig. Other practitioners have reported some success by two or three injections of a properly prepared bacterin into the sow during the last stages of pregnancy.

From observation it becomes evident to the unbiased observer that pyemic arthritis in pigs is primarily due to the breeding of sows that have an infected uterus, and the breeding of healthy sows will practically eliminate this disease.

Chemical Foods

G. W. BROWNING, Mobile, Ala.

THE IMPORTANCE TO HEALTH of the chemical elements in an animal's system is a subject which has had an occasional period of consideration in our literature, subsequently to be neglected to an extreme degree. To me it seems now to have been neglected for some time, and for that reason I have taken this subject for presentation to the practicing veterinarian and the veterinary profession in general.

The topic of starved nerves is certainly not having the attention it should have. Serums, antitoxins, surgical methods and such present-day courses will never reach the condition. The patient must have the real chemical foods or what is more commonly called minerals.

Since constitutional diseases are always associated with more or less demineralization of the tissues, it is reasonable to assume that the administration of mineral salts in connection with the regular protein and carbohydrate diet may prevent, arrest or cure many obscure pathological conditions and thus explain the therapeutic value of these salts, which are really "chemical foods," in conquering morbid conditions following infection and shock.

It is evident, therefore, that an adequate supply of certain mineral salts is necessary to insure normal metabolism and that mineral salts play an important role in maintenance of the health and vigor of the body by promoting the efficient performance of its various functions. It is moreover logical to assume that an inadequate supply of such mineral salts, under certain conditions, not only interferes with normal metabolism, but conduces to pathological derangement. That is to say, a deficiency of certain mineral salts will contribute to, if it does not directly cause, disease.

It is seen that nutrition is not dependent solely on protein, carbohydrate or fat; that mineral salts play an important part in tissue nournishment; that the tissues are often deprived of their necessary supply of calcium, phosphorus, potassium, sodium, iodin and other mineral constituents; and that this is brought about through faulty assimilation or through the employment of a diet which does not yield an adequate supply of mineral salts.

There are two periods in life during which the organism requires a maximum amount of minerals, especially calcium. These are the periods of growth and of reproduction. The fetus has been called a "calcium parasite" because it requires a large amount of this element and, in order to obtain it, draws upon the maternal tissues in a way that often seriously impoverishes the mother and leads to grave morbid conditions.

It has not been so very long ago that I heard a learned lecturer before a scientific organization give a profound lecture on the subject of food values. He confined himself to proteins, fats, starches and sugars, not even mentioning salts of the principal socalled "inorganics" such as calcium, phosphorus, potassium, and sodium.

Proteid Foods

All works on diet have much to say about proteids so much that it inclines to generate the impression that the body

must be given a certain amount daily or it will go to ruin. The proteid foods are not superior to all others, except that they contain a larger variety of the primary elements and for this reason would be ideal for use when a mono-diet is desired. But where a great variety of foods are given an animal at the same time, it is questionable if the representative proteid foods are not fed too freely, and from this cause may generate much ill health.

Mineral foods should not be prescribed to take the place of drugs or any other curative agent. We should be very careful about recommending them as curative agents, only advising their use as a preventive measure and solely to be employed for that purpose.

A mineral feed to be of value should be devoid of complex mixtures, such as copperas, sulphur, Glauber and Epsom salts, and should be at least 80% digestible and 100% soluble. Just as drugs are compounded, in order to secure increased therapeutic effect, so synergistic action may be obtained through a proper combination of the chemical foods—calcium, iodin, phosphorus, potassium and sodium.

It is frequently argued that cell salts cannot be taken up by our digestive and assimilating systems in proper proportion to balance our requirements without first passing through the vegetable or animal food route. Is this true? Does not nature allow us to select only a proportion of the amount at hand and leave the balance?

The Story of the Seed

A seed is planted. Sufficient nourishment is supplied with the germ to last for a few days. Its growth begins within itself. It then seeks other nourishment. It selects from the inorganic kingdom the necessary cell salts about it, forms them into solutions and colloids, develops its special form of life, using only what is required to supply this individual plant, discarding the remainder.

Continuous annual repetitions exhaust the soil of certain elements. The plant then becomes wholly or partially starved. Partaken of by animal life, the result is a normal supply of mineral salts or a deficiency, according to the health of the plant, bringing about a complete or a partial cell life of the animal.

The agriculturist knows this well. He is giving the subject great study and is now supplying both soil and organic life the needed supply of mineral salts, or returning his barren fields "back to the Lord" and seeking another virgin location. For instance, he notices that his swine having insufficient iodin breed hairless pigs. A supply of this mineral corrects the trouble. His cattle on the plains of Australia become paralyzed. He finds the cause to be insufficient phosphorus in the soil. This is supplied both to soil and animal and the condition ceases. Similar illustrations can be given ad libitum. We had better get our ear close to the ground, take a special course in agriculture, and "go thou and do likewise."

We know many of our soils are being depleted, thus furnishing insufficient cell salts to our crops and starving our animals of most important mineral salts, resulting in deficiency diseases, nutritional troubles, maldevelopment; in fact, resulting in a long line of nutritional diseases and sub-alkalinity, popularly called "acidosis."

My experience in feeding minerals to live-stock dates back some thirty years, when we used to make the barren mares breed and stop the ravages of "big head" in horses by adding minerals to their daily ration. But for fear the reader may think I am going back to ancient history, I will not report those cases, but will give a few of a later date.

Case No. 1

Mr. S. has a dairy herd of 80 cattle, and I have been doing his veterinary work for the past five years, this work consisting of removing a dead fetus or placenta or both. I usually made a trip about every ten days or two weeks for this purpose. Finally I told him he always would need a veterinarian occasionally

but he need not have me make so many visits if he would use the proper preventive measures. I explained to him that he was pushing his cows to the limit on an indigestible protein feed and they were not getting enough mineral salts, consequently the animals had an acid condition of the system which caused so much abortion in the herd. Further, I advised that if he would feed about 4% minerals by adding them to the grain feed I was confident that with the proper drugs we could reduce the trouble, if not completely stop it.

He agreed to have me order him 500 pounds as a trial. However, I informed him that with the condition his cows had gotten into the mineral mixture alone would not stop the trouble, and as it took two weeks for the mineral feed to arrive, I gave a prescription for a medicinal treatment to use during these two weeks, as follows:

℞

Pulv. stramonium sem.	℥ viii
Pulv. calcium phosphaet prec.	℥ x
Pulv. fenugreek	℥ iv

M.

Sig. Tablespoonful to each cow in each feed, twice a day.

This prescription was discontinued when the mineral feed arrived and was used no more. The 500 pounds of mineral feed lasted about two months, during which time there were but two abortions and they occurred during the first two weeks after the feeding of the mineral mixture had begun. From this time on, he ordered in ton lots and has never been out of the mineral feed a minute from the time we ordered the first ton lot, which is three years ago. I still do the veterinary work for Mr. S. but haven't had occasion to remove an immature fetus or placenta in three years.

Case No. II

Mr. P, who has a dairy herd of 30 cattle, came into my office on the third of last January and remarked, "Dr. Browning, I am financially ruined if we can't do something to stop my cows from slinking their calves." He suggested that I send for some vaccine and vaccinate the whole herd as quickly as I possibly could. I told him I preferred going to his place and making a thorough examination of his cows and premises before I did anything, to which he consented.

I first examined the feed, which was a commercial preparation guaranteed 16% protein, but it had a musty smell, was heavy in cottonseed meal and would have been all right to use on his land. To cap the sheaf, in addition to feeding this fermented proteid feed, he was adding black strap molasses to each cow's ration.

A physical examination of the herd showed nothing particularly wrong, except that three or four cows had a stinking discharge from the uterus. This I irrigated out with a solution of iodized echafolta, one ounce to a gallon of warm water.

I explained to the owner that vaccination in the case of his cattle would not do very much good and to get any results the vitality of the herd would have to be built up, both by medicinal treatment and proper feeding. He said, "I will do anything you say."

I gave the same medicinal treatment as in case No. 1 and put the cows on the same mineral mixture. I didn't hear from the owner for nearly four months, when I was called to his place to castrate a colt. I was waiting to hear what he had to say about the cows but he never said anything until I got ready to leave when he remarked, "By the way, Doc, I almost forgot I want you to order me another 500 pounds of that mineral feed as I only have a half sack left, and I want to tell you that stuff kept me from going into bankruptcy."

In both cases Nos. I and II a complete change was made in the grain feed as well as adding the mineral mixture to each feed.

Case No. III

A six months old Collie puppy was presented at my hospital to treat for a broken leg, which was already splinted

up and had been for a week. I removed the dressing from the left hind leg and could not see anything that resembled a broken leg, although the puppy could not stand unless he was supported. By this time I noticed he gave way in the left front leg as well. It did not take me long to diagnose the case as rickets. The owner lived ten miles in the country and did not want to leave the puppy at the hospital but wanted me to give him some medicine for the animal, which I did.

I gave the following prescription as a tonic and to aid digestion:

℞

Specific tinct. chelone	ʒ lss
Specific tinct. stramonium	M x
Elixir lactopepsin q. s.	℥ iv

M.

Sig. Teaspoonful 3 or 4 times a day.

I also gave a prescription for a raw food composed of two quarts oatmeal, two quarts wheat bran, two quarts soy bean meal, one quart bone meal, to be fed one-half pint once a day, wet with milk but not enough to make it sloppy. I also dispensed some five-grain lactate of calcium tablets with instructions to dissolve two tablets in a little warm water and add to each feeding of milk that went over the raw cereal diet. For the evening meal, I prescribed boiled meat, cut up fine.

The owner took the puppy home and said he would report in a week. However, it was three weeks before I heard from him, when he put the puppy in his automobile and brought him to the hospital for me to see again. The improvement was much greater than I had expected. The animal walked and got around quite well but still showed a little giving away on the left side. I ordered a continuance of the treatment, both medicinal and food, for two weeks longer, at the end of which time the owner came in one morning and said, "You ought to see that puppy—he can outrun me and you both."

From this time on, the medicinal prescription was discontinued, but I advised the owner to go right on giving the animal the same diet. The puppy is now ten months old and stands as squarely on his legs as any dog.

Time and space will not permit, or I could give many other cases of similar character in horses, cattle, hogs and dogs, where a mineral feed has done good work.

I don't want the reader to get the impression that I can cure contagious abortion in cattle and other animals, but I do believe that most abortions in cattle are nutritional deficiencies, and if so, can be largely prevented by an adequate supply of a properly balanced mineral ration.

Every kind of germ seems to find comfort in the animal afflicted with contagious abortion, and if the Bang bacilli happen to be found in company with other germs in a subject suffering with symptoms called "contagious abortion," it is just because they stepped over to see if the soil was suitable for their propagation. This has been the writer's contention for these many years past.

You cannot get wheat to grow in a cranberry bog, nor cranberries to grow in a wheatfield. I believe if we pay more attention to conditions in the disease called contagious abortion and less to theory or names, we will have better success in treating this malady.

I learned many years ago that stramonium and belladonna corrected acidosis in the animal's system, and when followed up by the proper diet, made a satisfactory treatment in these conditions.

The greater the amount of calcium in the skin the lesser is the degree of irritability and the more potassium present the greater is the cutaneous irritability, according to the results of animal experiments reported by Dr. J. V. Klauder and Herman Brown of the Research Institute of Cutaneous Medicine. The investigators suggest that eczema may be due to faulty equilibrium of the biochemical mechanism of the nerves and cells of the skin.

Nose Printing Your Cat and Dog Patients

J. G. HORNING, D. V. M., A. J. McKEE, D. V. M., H. E. KELLER, and K. K. SMITH,
Houston, Texas

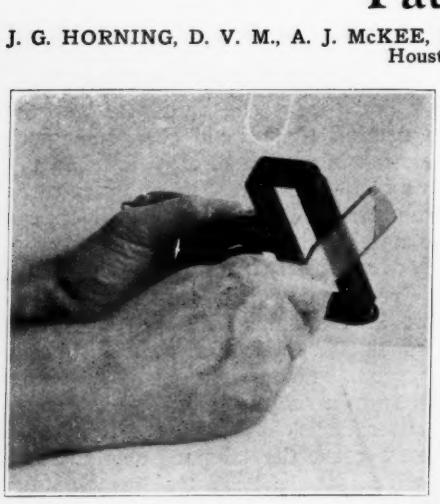

Fig. 1

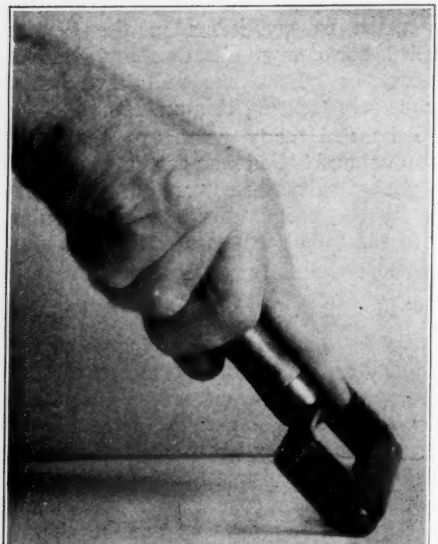

Fig. 2

AS AN EXTRA SERVICE to our clients, we decided to nose-print their dogs and cats, for reference in case they were ever lost or stolen and when found should need a positive means of identification.

First, we had to determine whether this was practical and then had to determine the most practical technic. Keller wrote to Bob Ellis, Bertillon Expert with the Beaumont Police Department who had done considerable work on this for over a period of years, and has over a thousand cases examined to his credit. He stated that it was absolutely practical, and in over a thousand cases examined he has never found two prints alike.

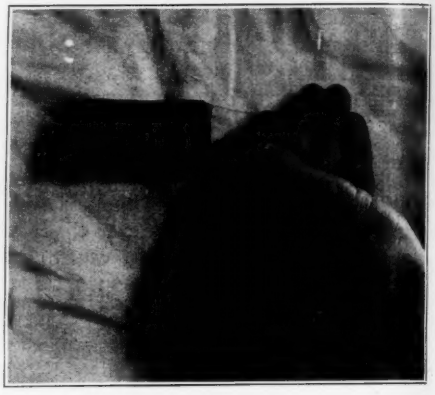

Fig. 3

Then in developing a technic, we found the method of using the roller to ink the nose was objectionable from a sanitary standpoint. We tried it with several rollers, washing the rollers with ether solution, but the chance for possible infection was too great, and this was discarded.

Keller who is Bertillon Expert, or rather director of the Identification Bureau of the Houston Police Department, then suggested

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after oiled paper, cardboard and metal strips were used, that we use glass cut in a handy shape and the same style they use to get prints from the prisoners who refuse to have their prints taken, and also use in taking the finger prints of dead people. The glass can be sterilized thoroughly.

Fig. 1 shows the glass for inking the nose being inked with the roller. As to the amount of ink necessary, a small amount is taken from the tube and rolled on a large glass back and forth as in Fig. 2. This is then rolled back and forth on the small glass

Fig. 4

used to ink the nose; the amount necessary is just sufficient to show the outlines of the finger prints when pressed on the glass. One can practice and in this way get the proper amount of ink to use. Fig. 3 shows the glass inked.

The glass is then held as in Fig. 4 and with a half rotating motion the nose is inked, position of operator and assistant shown. Then the wooden paddle shown in Fig. 5, is brought over the nose surface that has been inked, using the same motion and pressure as shown in Fig. 6. The paddle is made of wood with a slot in which to place cardboard or paper. White mimeograph paper takes the best print. The results from this print will be as shown in Fig. 7.

The roller that we have adopted is the Y. & E. Roller and the ink used is the Y. & E. Finger Print Ink, both shown in Fig. 8. Although any small ink roller and ordinary black printers' ink can be used, to

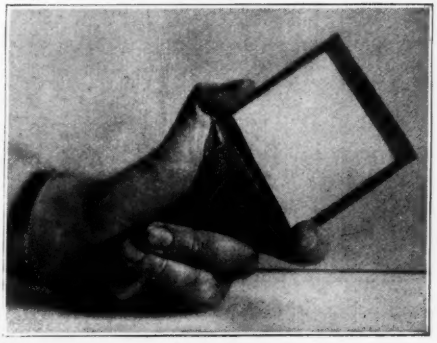

Fig. 5

Fig. 6

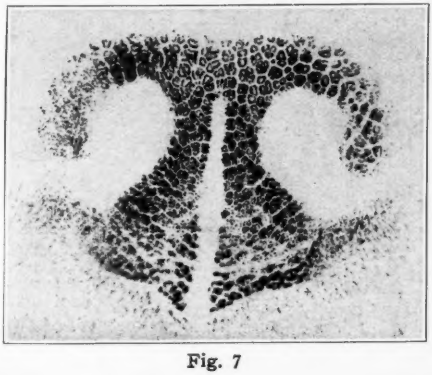

Fig. 7

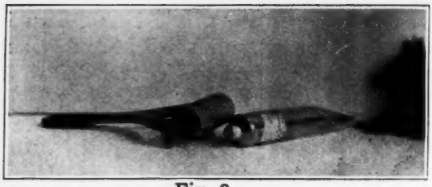

Fig. 8

obtain the best results one should use special finger print ink and roller for this work. To determine the identity by the nose print one has to use a magnifying glass and get the points in common.

The small print shown of the dog's nose when magnified sufficiently will reveal the same points in common as one can observe on the enlarged reproduction of the prints shown. We are showing two enlargements so that you can check the one against the other. Both enlargements were made from a print of the same nose but by different men, one not being as distinct as the other but still distinct enough for identification of the points in common.

In the upper right of the pictures from the center, you will find a C followed by an O, the O being somewhat square. From this point every point in common, that is every point you see on one picture that you are able to see on the other, would be that much more conclusive evidence that it was a print of the same nose. When one finds over 25 points in common it would be conclusive evidence. The same technic is used for cats.

We tried foot prints of the dog and cat and while one could find positive identification, there was too much chance of the dog scarring the pads, or running over pavements and destroying the lines or marks. In fact, with every causative agent taken into consideration, there was too much chance of error or possible error so this was aban-

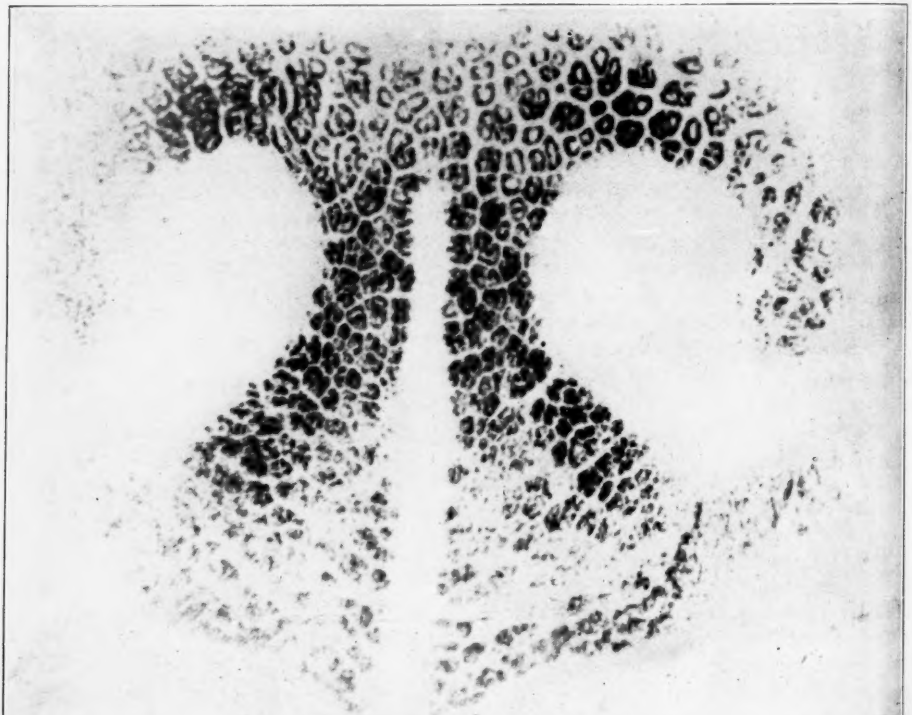

Fig. 9

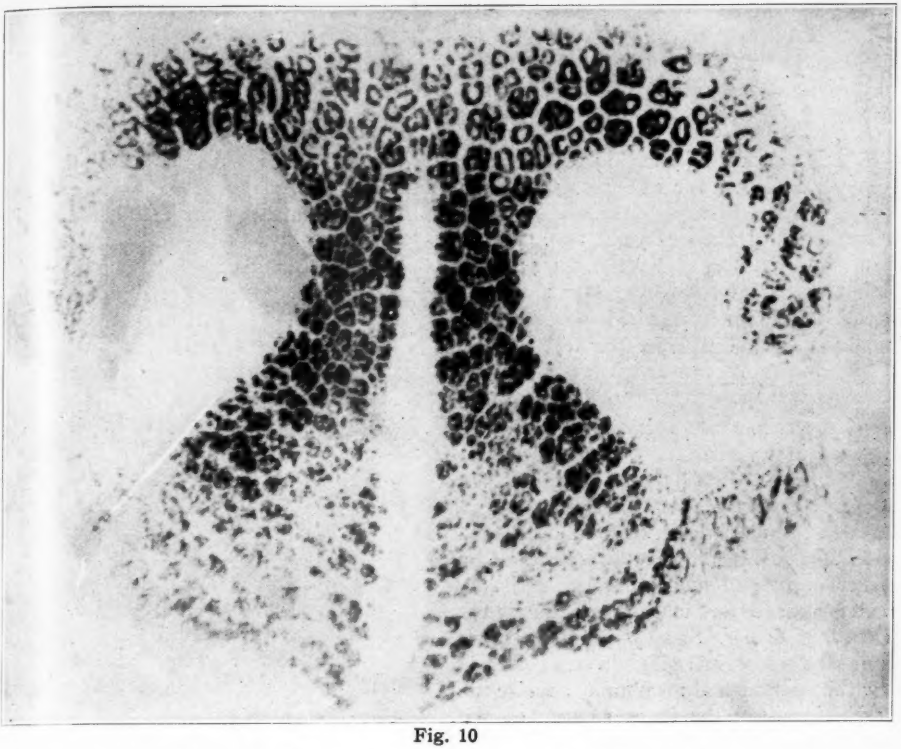

Fig. 10

doned, and we confined our work to nose prints.

One thing to bear in mind is that practice makes perfect, and one should not expect to take perfect prints from the start.

In cases where the nose is moist, we wipe it with a sterile towel before inking, also always hold the dog's mouth shut if he shows any tendency to lick out the tongue over the nose.

We believe that veterinarians using this service will aid their clients and to a certain extent add one more barrier against the dog thief. This could also be used by the American Kennel Club in registering dogs and prevent possible substitution or faking of the pedigree, as a nose print representative of the club could be appointed for the various towns and cities. The whole outfit can be arranged for not more than seven dollars, and it can be made for one dollar. The nose print can be attached to the hospital chart with a description of the dog for further reference. This is something that directly affects the veterinarian and is of value.

All calves are born non-reactors both to the agglutination and complement fixation tests for bovine infectious abortion regardless of the reaction of the dam.

The principal factors in producing a clean wholesome milk are: (1) clean utensils, milker, cow and barn; (2) healthy cows and milkers; (3) proper refrigeration of milk.

A good dairy cow that produces about twenty pounds of milk daily will require a ration of 2 to 2½ pounds of digestible protein and 12 to 15 pounds of digestible fats and carbohydrates.

Pyorrhea in the Dog and Cat*

HENRY GRAY, M.R.C.V.S., London

THIS DISEASE of the dog and cat[1] has been known for a very long time, and was described by Delabere Pritchett Blaine nearly a hundred years ago. It has been termed Rigg's disease, suppurative periodontitis, infective or septic alveolitis, infective or expulsive gingivitis, receding gum, periodontal disease, oral sepsis, one of the forms of chronic infection of the jaws, or non-specific infectious alveolitis.

It is a suppurative inflammation commencing in the margin of the periodontal membrane between the gum and neck of the tooth and gradually extending downwards to the apex of the tooth between the root shaft and the alveolus, whereby a separation or pocket is formed and continued until the tooth is loosened and falls out or is extracted. According to Dr. Stanley Colyer it commences as a marginal gingivitis and extends down the periodontal membrane, because the lymphatics from the inner surface of the gingival trough take that route.

It attacks any breed, but is mostly seen in lap dogs or house dogs fed on food that makes very little, if any, demand on the teeth before it is swallowed. Although mostly encountered in middle-aged dogs, it may be witnessed in dogs of all ages just over a year and upwards. In reality its incidence and severity increase with the age of the animal.

By the time dogs, fed mainly on soft or easily-swallowed food that makes no demand on the teeth, reach middle-life it affects 100 per cent of them. It is never seen in dogs and cats that use their teeth for the reduction of their food and gradually wear them down in that process and are fed on bones and coarse food until the end of their natural life. When affected dogs do show signs of the wear of the teeth, it is only in those that have been given bones and other coarse material in the earlier part of their lives and then afterwards have had them discontinued for soft or easily-swallowed food.

It is rare in farm, watch and sporting dogs, which are usually fed only once in twenty-four hours, on food that requires reduction by the teeth before it can be swallowed. On the contrary, it is very prevalent in Samoyede and other foreign breeds that have been bred and maintained under our foolish system of domestication only for a few generations There is no hereditary predisposition to it. When it occurs in several generations it is because the same pernicious system of feeding has been continued from one generation to the other.

Dogs eating putrid flesh do not show this disease as long as they have other food of a coarse nature to reduce and to keep their teeth in order. On the contrary, animals fed on raw meat, chopped up or minced, and not allowed coarse food, have it as much as those fed on soaked biscuit or other sloppy material.

These facts indicate that pyorrhea is not so much due to the chemical composition of the food as to its texture, density or bulk.

It is always associated with dirty teeth, which are often encrusted with tartar. This encrustation is sometimes so great that the teeth are completely hidden from view and, not rarely, it acts as a wedge that prevents the mouth closing.

It is a chronic destructive inflammation of the tissues that bind the tooth to the alveolar walls, which also become involved in that morbid process. In consequence of this, a space is formed and left between the tooth and the alveolar wall which provides a receptacle for débris of food and inflammatory discharges, which undergo putrefactive changes to keep up, or continue, the destructive process, until the tooth is loosened and finally evulsed. Various bacteria such as spirochetes, spirilla, colon bacilli, strepto-

*Presented at the meeting of the National Veterinary Medical Association of Great Britain and Ireland, Dublin, July 27-30, 1926.

[1] It may be observed in wild carnivora, such as the fox, lion and tiger, kept in confinement in zoological collections or elsewhere.

cocci, the fusiform bacillus, etc., are found in the exudates, putrid collections, and inflammatory zone. Most of these are saprophytes and are normal habitants of the dog's or cat's mouth.

The disease usually runs a course of several years, or the remainder of the duration of the animal's life before the teeth become loosened, and it calls for their extraction if they do not fall out of their own account. Naturally it progresses with a greater speed as time goes on until it is terminated by evulsion or extraction of the teeth. This is due to the fact that the wider and deeper the "pocket" becomes the greater the accumulation of decomposing matter to increase and accelerate the destructive inflammatory process.

A disused tooth, unless cleaned after every meal, accumulates filth which undergoes decomposition. It then acts as a foreign body —at least, the exposed part of it does, and soon begins to infect or irritate the soft tissues in contact with it. A disused tooth makes no demand on the alveolus and jaw bone to supply that amount of nutrition which it would otherwise obtain to strengthen its relationship with its surroundings. In consequence of this, these surroundings (alveolar walls, gum and jawbones) are less resistant to microbial life which is always on the alert to gain entrance through a weakened spot such as the flabby or spongy margin of the gum and the intervening periodontal membrane between that gum and the neck of the tooth. It is well to point out that the union of the tooth to the alveolar wall forms a joint and normally it should be considered a weak spot.

The more the tooth is pressed upon, the stronger and more resistant this bond, together with the jawbone and its covering, becomes. There is one fact that must not be overlooked, and that is that the jaws are the most powerful limb the dog possesses for seizing his prey or food and for offence and defence; they are not so much used for that purpose in the cat, that is compensated with pronating fore feet with retractile claws, and has an eye possessing powerful vision.

The causes, therefore, of pyorrhea are dirty teeth and lack of pressure[2] on the alveolar walls, due to the fact of the dog or cat not receiving food of such a nature as would make it use the teeth to keep them clean, to harden the gum and strengthen the alveolar wall and jaw. When fed on a hard or coarse meal, which the dog could not swallow without tearing it in shreds or breaking it into small pieces, the teeth gradually wear down and become firmly fixed in their respective alveoli and are kept perfectly clean and sweet; the gum is hardened and is tense, fine and of the same pale pinkish hue as that of the rest of the mucous membrane covering the remainder of the surface of the jaws. The mucous, mucoid and salivary glands secrete freely and their secretions tend to assist in keeping the mouth sweet and moist and mixing with the food and helping it to become better digested after it reaches the stomach. A normal dog's mouth is bright, moist and sweet, free from any unnatural smell or undue moisture. A healthy dog, almost as soon as it has been weaned, if given suitable food which he has to reduce with his teeth, may be maintained in perfect health when fed only once in twenty-four hours.

I have repeatedly fed Pomeranian puppies, weighing 2 lbs. and under and aged three months and even ten weeks, with small bones covered with meat and supplemented afterwards, now and again, with a few scraps from the table and only once in twenty-four hours. Needless to say, they have thrived and kept in splendid health and their feces were firm and hard, and passed with no difficulty. Dogs fed once in twenty-four hours have keen appetites and seem to gnaw bones and tear food with avidity; they are also much more active, courageous and intelligent. Whatever age they attain their teeth are perfectly clean and sweet, but worn down by usage. They are as clean at ten or twelve years of age as they were at one year, but naturally of a primrose instead of a whitish color.

What a different picture one gets—which is the general rule—with pet, house and

[2] A good example of lack of pressure creating or predisposing to disease is the frog in the horse's foot, whereby it becomes rotten or the seat of thrush.

other dogs fed two or three times a day on chopped-up or minced meat, pappy meal, bread or biscuit soaked with gravy or soup and other improper food that does not give the teeth anything to do so as to wear them down, keep them clean and to harden the gum. Such animals soon begin to have dirty teeth, an offensive breath, spongy gums and an accumulation of tartar on their teeth. It is not so many months before the gum around the tooth begins to swell and stands out prominently; it bleeds on the slightest touch and soon a separation takes place between it and the neck of the tooth. As the disease advances, the teeth become darkened or blackened in color and that part of the root shaft in the vicinity of the neck of the tooth is laid bare by inflammatory destruction of the gum and of the free edge of the wall of the alveolus. This process continues to progress gradually for a space of time covering several years, until the tooth is merely held in position by an attachment of the root apex to the bottom of the alveolus. When there is a great accumulation of tartar, this gradually increases, irritating the alveolar walls or processes and causing these structures to undergo inflammatory destruction with greater rapidity until, finally, the tooth is no longer attached to the alveolus and falls out, unless kept in position by the tartar or teeth on either side of it or of the opposing jaw.

In many cases, as in the premolars or molars, with two or more roots, there may not be any apparent destructive inflammation or receding of the gum, but on exploring the shafts of these roots one or two of them may be found to have separated completely from the alveolus and the tooth be held in position by one or two of the roots only. Even the free surface of the tooth may appear clean, and the gum, at first sight, closely in contact with the neck of such tooth.

Frequently the gum and alveolar wall on the external face of the jaw undergo complete destruction, leaving the whole depth of the external face of the root shaft exposed to view, while the internal or lingual face of the root shaft is attached, more or less, to the alveolar wall. This is principally seen in the canines, and not rarely the carnassial and first molar teeth are affected in the same manner.

As a general rule, the internal or lingual face of the alveolar processes in the molar arcade does not show very much of the ulcerative changes nor are the teeth much encrusted with tartar, nor have they undergone discoloration. In advanced cases, however, it becomes involved. This relative immunity is evidently due to the constant movement of the tongue keeping the internal face free of food débris and microbial accumulations or secretions. Tartar, may, however, be seen on the internal face of the canines and incisors.

In the majority of instances, the uncovered or separated part of the root has a greenish or blackish appearance and a rough or uneven surface.

When several teeth are involved in the process there is, in non-pigmented gum, a bulging red line about ⅛ in. to ¼ in. deep all along the margin of the gum for some distance—or the whole distance round the dental arcade of both upper and lower jaws. It has a much higher color than the normal pale pink hue of the membrane covering the rest of the jaw. This congested line bleeds on the slightest touch. It may be taken as the first palpable sign of the malady to attract attention.

In many of the more vigorous breeds—as the pointer, setter and retriever—living partly on a soft diet with an occasional bone or other roughage, there is very great resistance to the infective process invading very far down the alveolus. This is shown by a prominence of hypertrophied bone and gum at the margin of the alveoli. This osteoperiostitis raises the alveolar processes above the neck of the teeth, making the free surface of them appear shorter than they really are or as if they had sunken into the alveoli. Like the thin, red line seen in the earlier stage of the disease, this bulging, hard ridge extends round the dental arcade. It is also heightened in color and often appears granular on the surface.

In the majority of cases of this disease there is an accumulation of tartar and no

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signs of wear of the teeth, which makes the teeth appear in consequence of receding of the gum and alveolar walls, to be very long. There is generally a more or less putrid odor given off from the mouth, and the gum and alveolar processes are spongy and bleed profusely when they are brushed or the loosened teeth are extracted.

The disease may attack all the teeth, many, or only a few. It is often irregularly or erratically distributed and sometimes only affects those on one side of the dental arcade, or the incisors or canines of the jaw, upper or lower. It has often a preference for the first molar and the posterior root of the carnassial or large sectorial teeth of the upper jaw. In rare instances, a group of teeth in the premolar arcade of the upper or lower jaw may be the seat of the trouble, while all the other teeth, including the incisors, are worn down and clean, and the gum and alveoli are perfectly healthy. Probably in such a comparatively rare instance, the disease was well advanced before the dog was allowed or compelled to use his teeth in the reduction of his food. It might, however, have been due to an injury.

Sometimes all the molars continuously are encrusted with a wall of tartar, giving the arcade the appearance of a stone or mud wall. Many of the teeth underlying this encrustation are absolutely loose and only held in position by the continuous layer of tartar with no partition or division in it.

The tartar in an uncleaned or untreated mouth is readily chipped off with scalers or broken away with tooth forceps. If the tartar has been removed on a previous occasion it is more difficult to remove the subsequent accumulation.

Very frequently those parts of the mucous membrane of the cheeks or lips which come in contact with the teeth, ulcerate, and in many instances this ulceration does not disappear until the tooth, or teeth, are extracted. This indicates that the dirty teeth have produced a local infection of in-contact structures. This is much more frequently observed when an acute general infection coexists for the time being with pyorrhea.

The gum and alveoli are generally sensitive, and when the disease is complicated with trench mouth or Vincent's angina if they are touched or manipulated by the veterinary surgeon, or moved whilst taking food, much pain or suffering is caused.

Complication or Effects

Pyorrhea, which is, in reality, a local infection of the joint or bond of union between the tooth and the alveolus—a weak spot in the system—forms a nidus from which putrefactive toxins are always being absorbed into the circulation and conveyed to other parts of the body. The "pockets" are also reservoirs for microbial distribution which, when the system becomes depressed through a chill, which is often the case when the weather changes from fine to wet or becomes chilly as it does when the wind is in the N. or E., becomes active and sets up disturbances in other parts of the body. It is for this reason that we see gastric, enteric, neuritic or meningeal attacks which coincide with adverse changes in the weather. These attacks often become periodic and do not, in numerous instances, finally disappear until all the affected teeth have been removed or the dog or cat has become toothless.

There is no doubt that the paraplegic or other forms of meningeal or medullary infection so common in short-legged, long-backed dogs as the dachshund and Pekingese originate from these combined causes. Arthritis is occasionally encountered. There is also no doubt that chronic interstitial nephritis, as common in adult dogs as pyorrhea is, is connected with it, and that the many cases of chronic pharyngitis, chronic bronchitis or "winter cough" in old dogs originate from infection or toxic absorption from the putrid alveolar pockets.

Acute septic infection, Vincent's angina, pneumonia, endocarditis and other similar maladies are not rare. Numerous cases of acute putrid intoxication are observed in ordinary everyday practice. The animals have complete loss of appetite, they vomit repeatedly, become rapidly emaciated, seem dazed, and suffer from extreme languor; the mucous membranes are pallid and the mouth gives off a putrid odor and the buccal or labial

membranes are ulcerated, often gangrenous. The symptoms rapidly disappear after the offending teeth have been removed and the mouth cleansed. The improvement is astonishingly sudden. A dog appearing as if in a dying condition before treatment was adopted became active and comparatively plump at the end of a week. In less acute cases, where the mouth has not been treated, but in which for the gastric effects and loss of appetite Brand's essence and bismuth have been administered, the animal becomes a living skeleton and dies from exhaustion. Such cases are common and could have been checked if the true cause of the disease had been recognized, the offending teeth removed and the mouth cleansed. Owners who neglect their animals to this extent ought to be punished. The suffering of animals from this cause is very great and it is seen more in those that belong to owners who profess great love for them and do nothing or very little to prevent such misery. Some of them who own animals seem devoid of common sense and cannot detect an odor given off by the mouth, worse than that of a cesspool in summer. Such people do not always belong to the female sex or to the working or even the middle class.

A profuse intermittent hemorrhage often originates from a pyorrheic alveolus. Its recurrence can be prevented by extraction of the tooth. A similar profuse intermittent hemorrhage from a nostril is not rare in aged animals. It is due to the apex of a loosened canine perforating the floor of the nasal channel. Future attacks are avoided by withdrawing the tooth, when generally a permanent ora-nasal communication remains.

A completely-loosened true molar not infrequently causes the animal to make a jerky or snatchy movement of the lower jaw on the upper. It is accompanied by a clacking or chattering noise.

Chronic pigmentary or vascular keratitis often affects both eyes; it recurs from time to time; there is no retrogression of the lesions, but there are periods of quiescence in the progress of the malady, which remains incurable. It is coincidental with, if not a consequence of, the putrid state of the mouth. Many persistent skin complaints arise from this most prevalent disease in pet and house dogs.

Hypertrophy of the gum, forming a more or less large or prominent vegetation often with a sessile or peduncular base, not infrequently arises from the margin of the gum in the vicinity of a tooth separated at its neck. Malignant tumors, either on one side or on both sides of the jaw, more in the upper than the lower, appear in some cases. In the cat such tumors involve the incisor region of the lower jaw, but they may be encountered in any other part of the dental arcade of either jaw. There is no doubt that some of these conditions are merely coincidental and have really no connection with pyorrhea.

Diagnosis

This disease should be distinguished from an abscess originating at the apex of the root of the tooth with the pus working upwards between the root shaft and alveolar wall and gaining exit at the vicinity of the neck of the tooth. There is generally a swelling on the face just below the eye. This swelling is about the size of a marble or even of a walnut, it is first hard and ultimately becomes soft and fluctuating and sloughs, leaving an opening for the exit of pus. It may heal up to re-form again and again, finally leaving an opening on the face. It may be unilateral or bilateral and is seen both in the dog and cat. This abscess usually arises from infection of the antrum or the blood stream and attacks one or more roots of the carnassial tooth or first molar or both. It may, however, originate from the pyorrheic process working down from the margin of the gum and alveolar prominence towards the root.

Acute gangrenous ulceration, or necrosis, of the gum and underlying plates of bone forming the outer walls of the alveolar cavities, which subsequently become exfoliated and expose the roots of the teeth, usually arises from local infection superimposed upon such general infections as distemper, typhus, piroplasmosis or trypanosomiasis. It mostly attacks young dogs, especially when they are erupting their permanent teeth, but it does occur also in adult dogs

already affected with pyorrhea, from which it originates during the depressed state of the system. It usually attacks a lot of young animals in the same kennel.

This gangrenous state of the mouth is frequently attributed to be characteristic of epizootic gastroenteritis or typhus (Stuttgart distemper), but it is a complication that may rise in any acute general infection, and is encountered more often in large outbreaks of distemper in kennels containing a great number of young dogs. It is what is termed Vincent's angina.

The dirty teeth, covered with a reddish or brownish scum, so frequently seen during an attack of distemper and so readily brushed off, leaving the alveolar margin of the gums, should not be confounded with pyorrhea although its cause is similar—none-use of the teeth during the course of the malady, which lowers the resistance of the mouth and favors infection.

Pyorrhea is, it should be repeated, a chronic progressive infection commencing in the periodontal membrane, binding the tooth to its alveolus and working downwards from the margin of the gum and neck of the tooth, attacking adult or aged animals.

Public Health

Although there is no evidence that this disease is transmitted from dog, cat or man to dog, cat or man, or *inter alia*, there is danger of people becoming inoculated with the putrid material from the affected animal's mouth. Many persons have developed serious wound infection from such a source and if they have not always succumbed from it they have not rarely recovered with the loss of a whole limb or section of it.

Animals with this disease have mouths which make them nothing more than mobile cesspools. This side of hygiene does not as yet seem to have attracted the attention of the sanitary authorities or M. O. H., or probably even the notice of the family physician.

Treatment

The usual practice of treating this complaint in dogs and cats is to scale and clean the firmly-implanted teeth and to extract the loosened ones. This is generally followed up by applying, after more or less long intervals, a mouth-wash composed of a chlorinated solution, dilute hydrochloric acid, peroxid of hydrogen, or permanganate of potassium solution. If such treatment were carried out regularly it would have some check on the progress of the malady. But the only satisfactory way to arrest it before it has gone too far is to feed the animal on coarse crunching, breaking or tearing food which will keep the teeth clean, harden the gum and underlying alveolar processes and increase the nutrition of the jaw and also of the whole alimentary system.

Vaccination, violet rays and radium or X-ray therapy may all be very well for entertaining the human patient during the time the disease is being arrested, but they are not practicable in veterinary practice, even if they should be in human practice. The same may be said of the toothbrush. How many people are there to be found who would brush their dog or cat's teeth after every meal or who would once treat its mouth antiseptically?

It is a preventable disease both in man and in dogs and cats. If man, or the dog or cat, were to be given food in such a form that he would have to use his teeth as near as possible as nature intended, this disease would not exist. It does not exist in the dog or cat that uses its teeth. There are numerous dogs and cats that live to extreme old age with worn down and clean teeth and a hardened homogeneous gum showing not a trace of this almost universal malady set up by man abusing nature.

When this disease attacks 100 per cent of dogs and cats and probably as many human beings by the time they have arrived at middle age and have been living persistently on food that does not make much, if any, demand on the teeth or the jaws, then there is no wonder this disease is so prevalent. What a contrast there is between the putrid cesspool mouths of the improperly fed and the sweet, clean and worn-down tooth mouth of the aged animal that has been fed in a rational manner.

Dogs, even puppies of the most delicate breed, and cats in general, only require one meal in twenty-four hours. They can and

do reduce bones, or lumps of meat or other coarse food before they swallow it. The function of the alimentary system is maintained in a normal state and when meal time comes round again in twenty-four hours the animal has a good appetite and enjoys his meal. Fed in such a manner he is more active and intelligent, he neither suffers from periodic attacks of diarrhea, vomiting, catarrh nor impaction of the anal glands, perirectal abscess, nor so-called constipation, Fed as naturally as possible, the feces of the dog are hard and chalky and those of the cat firm and well formed. Passage of hard feces by the dog keeps the anal glands free of an accumulation of hard or firm, dark, greasy sebaceous material and prevents them from becoming the seat of impaction, catarrh or suppuration.

Overfeeding, or more than one meal a day, makes a dog fastidious over it. The decrease of appetite is generally a safeguard, but most people who have more idiotic sentiment than reason, in order to tempt the animal offer it tit-bits or some dainty or other.

By improperly feeding a dog a vicious circle beginning in the mouth is created and, as a rule, it does not end until one or more organs have become altered in function, and disease—often an irremediable one—is produced. The fat, distended and dull animal with a putrid mouth is the result of such practice.

The longer a meal takes to reduce before it is swallowed the better it is for digestion and the maintenance of health and vigor.

By feeding dogs or cats properly, this disease and, in consequence, much suffering are prevented. How many dog-owners are there who profess love for their animals and yet, on the other hand, create no doubt quite unconsciously, much suffering by refusing oftenmost obstinately to give them hard, crunching, breaking or tearing food and to feed them only once in twenty-four hours. It seems in many of them to be an obsession to feed their dogs irrationally. The dog is the victim, not the so-called animal lover.

Dog owners in general are absolutely ignorant as to how to feed a dog or cat and thereby to maintain it in health. This is not entirely their fault. It is partly due to those amateur writers in the press or of guide books who know very little, if anything, about the principles on which a dog should be fed, and partly by our own profession disseminating erroneous information.

Blaine, who knew of the pernicious system of feeding that prevailed in his day and how its effects could be combatted or prevented by his recommendations as to the feeding of dogs, has in reality handed down to the present time the same pernicious system. Evidently the teaching was of the "least resistance" description, or how to please the owner at the expense of the dog. Very few, if any, teachers or writers since Blaine's day have attempted to combat that pernicious teaching, which is most illogical. There are now many dog-owners who do at the present day practice Blaine's teaching and, in consequence, will still have 100 per cent of adult dogs and cats fed on those principles suffering from pyorrhea and its attendant evils. Apparently man professes to love the dog for the sake of the dog, but evidently he does so for his own selfish ends. It gives him great pleasure to be fawned on by his dog that makes a fuss of him and follows him obediently. He is delighted to see his dog beg for tit-bits and gulp them up with a lick of the chops and then, with eager eyes, ask for more. He little understands that he is laying the foundation for the future suffering of his noblest friend.

When he has created this suffering then he, in a very large number of instances, begins to experiment blindly on the poor animal, by forcing down his throat something of which he knows nothing for a diseased body about which he knows less. There is much more torture or experimentation done unconsciously every day by a very large section of dog and cat owners, or other amateurs, than there is performed in a year by scientific investigators or vivisectionists who have definite objects in view.

The stomach of the dog and cat is comparatively very large and it is destined to hold a great quantity of bulky and relatively indigestible material for it to cope with and

to distend it. The intestine is, on the other hand, relatively short and simple. The digestion of either animal is very powerful but generally slow, and the bulkier and tougher the food the longer the animal can go without a meal. They are carnivorous animals living under natural conditions on herbivorous and graminivorous and sometimes omnivorous animals, the viscera—including the contents of the stomach and intestine—of which they usually consume before attacking the muscular and other skeletal tissues. For this reason we are able to understand why some dogs, not allowed their liberty but fed on daintily-cooked food or biscuit, have an instinctive liking for fresh horse dung, or fresh dried cow or calves' dung when they get the chance to meet with it when they are temporarily at liberty. Dogs at liberty, as on the farm, consume it, but farmers and others used to a country life know the instinct of animals and are not disgusted at what their dogs do. They know that the dog and cat are provided by nature with teeth for the purpose of seizing, gripping, puncturing, tearing, cutting, breaking or crunching their prey or food so that it may be reduced before they swallow it with avidity. Fresh or uncooked food is more nutritious than cooked food. Bones are harmless to dogs and cats brought up on them. They cause less trouble than needles and thread, bonnet pins and other articles of millinery, string, stones, rubber balls, corks, meat skewers, etc.

In conclusion, pyorrhea is a preventable disease. It can be and is prevented by giving dogs and cats food that requires to be broken up, torn to shreds or crunched into small pieces by the teeth before it can be swallowed.

Both dogs and cats, aged from three months and upwards, can reduce and digest bones and other rough material and may be maintained in perfect health only on one meal of suitable food in twenty-four hours.

Food should not be minced or chopped or broken up, but given in such a bulk that would make the animal use its teeth to reduce it before it could swallow it. The dog's or cat's teeth are for this purpose. By feeding dogs rationally they may be saved much disease and suffering.

Conventional man scoffs at nature and does nearly everything he can possibly do to oppose her. But nature does not take kindly to being snubbed, mocked or opposed; she is relentless in her revenge, not in a slipshod manner, but with mathematical precision and determination. This is well illustrated by the saying: "As you sow, so shall you reap," which science interprets as "cause and effect." If man had not stifled his instinct or that of his dog, or knew or were taught how to feed himself or his dog from infancy up to old age, he and his dog would not be troubled with pyorrhea. It is the duty of the state to see that its citizens are instructed before they leave school how to prevent this and other preventable diseases or miseries. The majority of its citizens go out into the world absolutely ignorant of hygiene. If a man does not know how to conserve his own health, how can it be expected that he can prevent this disease in his companions or servants?

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Black tongue in dogs is similar in many respects to pellagra. In other words, black tongue is apparently a deficiency disease. The exact nature of the deficient elements is unknown. However, black tongue can be prevented by including butter fat in a ration containing ample protein.

Chloralose and Its Action on Cats

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TWO GRAINS of the Chloralose were added to 100 cc. of normal salt solution that had been boiled for two minutes. Five cc. of this solution was given to every kilogram (2.2 pounds avoirdupois) of body weight. When given in this strength there will be no bad results but over this there is danger. The solution is best administered subcutaneously.

Twelve cats and kittens were tested as per report below, from which we compiled the dosage mentioned above.

Kitten No. 1. Black, age one month, weight 15 ounces, sex female. Given 5 cc. subcutaneously at 1:30 p.m. in four minutes asleep, reflexes present; in 10 minutes voided urine; in fifteen minutes incision made through skin on abdomen, reflexes slight; in thirty minutes no reflexes to incision through skin; at 2:30 p.m. apparently dead; 2:35 p.m. pronounced dead.

Kitten No. 2. White body with tiger stripes in spots, male sex, weight 15 ounces, age one month, same litter as Kitten No. 1. 1:32 p.m. given 3 cc. of solution; in twelve minutes asleep, reflexes good; twenty minutes under was castrated with slight reflex when testicle was cut into but no reflex when going through the scrotum; 2:30 greatly relaxed, breathing normal as if in natural sleep, mucous membranes normal in color; 8:30 dead.

Kitten No. 3. Black, male, age six weeks, weight one and one-fourth pounds, given 3 cc. at 1:35 p.m., was groggy in five minutes, staggered around growing weaker and weaker and finally went to sleep; 1:44 p.m. reflexes fair; when the operator would blow in its face it would fight the wind weakly with the paws, (this test was used on all, so when we state reflexes fair, we mean they would fight wind blown in the face, and draw their legs away when touched with the hand.) 1:50 p.m. no reflexes when castrated. Last seen at 11:30 when he was sleeping as normal and in the morning was crying for milk.

Kitten No. 4. One gray tiger striped, male, weight one pound, six ounces. 3 cc. given intraperitoneally at 1:38 p.m.; kitten greatly excited from the start, groggy inside of 1½ minutes falling from one side to the other, twitching of legs, head and neck, asleep and showing very slight reflexes at 2:12 p.m. Castrated at 2:15 p.m. showing very slight reflexes when testicle was cut. O. K. in morning.

Kitten No. 5. Tortoise shell, female, two months old, weight 1 and ⅝ pounds, given 3 cc. at 1:40, slight reflexes 1:59½ p.m., incision made into skin over abdomen 1:65 p. m., no reflexes, sleep normal the rest of the day, crying for food in the morning.

Kitten No. 6. White with black spots, female, weight 2 pounds, age two months, given 5 cc., 2 p.m. groggy and very weak at 2:15, asleep at 2:18 p.m. Incsion made into skin at 2:30 p.m., no reflexes, sleep normal through night, wanting food in morning.

Nos. 7 and 8, males from same litter, castrated half hour after being given 5 cc., no reflexes, recovery normal.

Cat No. 9. Tiger and white spotted, weight six pounds, age about two years, just through nursing a litter of kittens, given 10 cc. at 1:41 p.m., rested on haunches after receiving hypodermic, looked around at kittens that had been given the solution and at 2 p.m. was quite groggy paying no attention to tortoise shell kitten No. 5 that was placed on its body at this time, reflexes slight but strong, would hardly move from touch to body but would fight wind blown in face; at 3:11 no reflex and at 7:30 p.m. was twitching violently, at 8:30 slight twitching, 11:30 p.m. resting O. K., and in morning O. K.

No. 10. Cat orange-striped smooth hair, weight six pounds three ounces, female, age over one year. Given 15 cc. solution at 2:08, started under at 2:30 p.m., reflexes at

2:40, no reflexes at 3:08, sleep normal throughout the day and wanted breakfast in morning.

No. 11. White with black spots, female, weight 5 pounds, eight months old. Given 22cc. at 4:10 p.m., started under 4:45 p.m., completely under 5:10, no reflexes, sleep labored at 8:30, same at 11:30 p.m., membranes O. K., found dead in morning.

No. 12. Cat, gray-striped male, age 18 months, weight 7 pounds, 2 ounces. Given 16 cc. at 4:15 p. m., no reflexes to castration at 5:15.

Bronchoscope and gastroscope passed on all cases except 1, 2, 3, 4, and in these cases stomach tube was passed. Mouth examined by opening with fingers and searching oral cavity with fingers. No bite block was used for this or the instruments.

Four days have passed since this work was done and cats and kittens that lived through the first day are all doing fine and no ill effects noted. One could use less than 5 cc. per kilogram, and this is warranted where the cats are very heavy.

One dog, a female Airedale, weighing 35 pounds, 3 years old, was given 50 cc. of solution at 2:30 or about that time, the dog played around her cage, ate a hearty supper at 5 p.m., showed no sign of any reaction at 9:30 or 11:30, in fact, we might just as well have given straight normal salt solution.

Notes on Chloralose

History: Discovered in 1895, by Prof Richet, of the University of Paris.

Chemistry: A white powder soluble in water, synthesized from chloral and glucose.

Technic: Dose: .10 gm. kilo wt. of dog. Dissolve in physiological salt solution. Bring solution to the boiling point, allow to cool, and administer intravenously or subcutaneously.

Physiological effect: Deep anesthesia lasting for several hours. Reflexes slightly exaggerated. Arterial blood pressure not lowered. No toxic after-effects.

Manufactured by: Etablissements Kuhlmann, 117 Boulevard Haussmann, Paris.

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Milk-borne outbreaks of typhoid fever such as the one that occurred among the students of the Lincoln Memorial University at Harrogate, Tenn., in 1924, in which there were at least 100 cases of typhoid fever with eight deaths, are sufficient evidence of the necessity for an efficient system of inspection.

According to a report of the U. S. Department of Agriculture the per capita consumption of milk and cream in the United States is estimated at 1.2 pints per day, or 54,326,000,000 pounds, an increase of more than 1,500,000,000 pounds over 1924. These figures are based on surveys and reports from 450 cities with more than 39,000,000 total population.

Streptococci are found in the majority of cases of bovine mastitis. These microorganisms are sometimes found in pure culture in such cases; in other instances they are associated with staphylococci, colon bacilli and other microbian agents. From laboratory findings in bovine mastitis and the results of control and treatment of this malady, it is apparent that streptococci are not only an important etiological factor in bovine mastitis but also are frequently pathogenic for man.

Sterility, particularly in males, may be of dietary origin. A diet deficient in fat-soluble vitamin E has been found by Evans to be an important factor in the occurrence of sterility in experimental animals (rats). It is probable that a like deficiency in the diet of farm animals would produce similar results. Thus a careful consideration of diet is essential in overcoming and preventing sterility.

The screw worm occasions a loss of livestock in Texas and the southwestern states of from three million to five million dollars annually. The U. S. Department of Agriculture in cooperation with local authorities has devised a number of ways of combating this pest, and it is anticipated that the future losses from screw worms will be reduced.

An organism closely related to the Erysipelathrix rhusio pathae (the causative factor of swine erysipelas) has been identified by Klander and his collaborators as the cause of an erysipeloid affection of fishermen that usually follows the bite of a fish or wounds from the fins or spines. So it is possible that some of the cutaneous affections of butchers may be due to infection with the swine erysipelas microorganism.

Does sweet clover poisoning occur in swine? Some cases were recently reported in swine in northwestern Missouri that evidenced symptoms similar to sweet clover poisoning in cattle. The symptoms reported consisted of subcutaneous tumefactions in the cervical and pectoral regions. The swellings were due to an accumulation of blood. Malignant edema or hemorrhagic septicemia was suspected, but streptococci only were identified by laboratory tests. This report is interesting, and Veterinary Medicine will be pleased to hear from practitioners that have had similar cases.

The "Sais"

GEORGE CECIL, Paris, France

A Pearl Beyond Price

ALTHOUGH THE INDIAN "sais" (native groom) is not the most important of the "Sahib's" domestics, he may stand high in "Master's" favor. For India is a country of horses and of horsey Britons, and the "sais" who keeps the animals under his charge in good condition is considered a pearl beyond price. At the same time, he seldom is highly paid. A Christian "buksheesh" awaits him, and the "Sahib" may be generous at other times—when, for example, his horses have distinguished themselves at the local races and gymkhanas. But the "sais" actual wages are a trifle, varying from ten to twenty rupees a month, according to circumstances. In some parts of India the rate is lower than elsewhere, at which the "Sahib" with a short purse rejoices.

In demanding a wage, the "sais" bases his calculations on the income of the hoped-for employer. . . "This 'Sahib'," argues the candidate, "being in a cavalry regiment, is rich. I shall ask him double the amount which the doctor 'Sahib' paid me." . . . And, he gets it, too. Indeed, many a well-to-do subaltern leaves the engaging of the servants to his "bearer" (valet), who, deducting a "buksheesh" from their wages, benefits exceedingly. "Dustoori" (commission) is one of the several emoluments; and he extracts it monthly—to the uttermost farthing. The fellow also may be allowed to buy the fodder, and, with the payment of each bill, his savings mount up.

The "sais" is furious at not being permitted to make this purchase, and to profit correspondingly. However, his lot is not without its compensations. He can feed himself for the equivalent of sixpence a day; his quarters are free, and, when off duty, scanty linen clothing, which lasts forever, serves him. Inyat Ali might be worse off.

"Gloss of Satin"

The "sais" has many good points. He generally takes care of the horses, for is he not fully aware that failure in this direction will mean "cut" pay? If the "Sahib" is known to be alert, and in the habit of inspecting the stables at unexpected times, Inyat Ali is ever on the look-out to see that all is in order. There are, of course, exceptions; when, indeed, are there not? The "sais" may, as the soldier says, "chance his arm," and woo slumber, though he should be up and doing. If caught out, the delinquent is sent packing, unless the "Sahib," being poor, cannot afford a more dependable "sais." Or, if "Master" is easy-going, he argues that a change might not be for the best. Which is very possible.

The "sais" when off duty wears an undistinguished head-dress.

A good "sais," however, decidedly is a find. He is respectful, sober (the "Koran"

and the various Hindu gods and goddesses have forbidden him to drink imported whiskey and home-made rum), clean and obedient. Much energy and skill are expended upon the grooming of each nag, for has not the "Sahib" poetically demanded "gloss of satin"? Hoofs are minutely examined daily for cracked heel or tenderness in the frog, the slightest sign of damage being immediately reported to headquarters. During the "rainy season" Inyat Ali goes over the horse's coat inch by inch, to detect signs of "bursatti," a sort of skin disease. For "bursatti," when it once gets a hold, is very hard to cure, and may disfigure a valuable animal for life.

Each "sais" possesses recipes for sore backs, rubbed shoulders, capped hocks, and the other evils to which horse flesh is heir. Even "bursatti," that most perplexing complaint, is included. For anything in the shape of an abrasion, powdered indigo is lavishly applied; skin disease demands sulphur. The native veterinarian naturally disapproves of the "sais" poaching upon his preserves. A blood feud may result.

A Picturesque Kit

When on duty at the polo ground, or in the race-course paddock, Inyat Ali forsakes his household rags for the kit provided by "Master." A snow-white turban, with a gigantic silver crest, takes the place of a ragged and unclean cap. A "chupkun" (long-skirted, single-breasted coat) of some dark color, and encircled by a "cummerbund," together with a voluminous waist-cloth, completes the costume. The "sais" takes great pride in his clothes, and if the "chupkun" is faced with red or yellow, thus drawing the attention of envious native bystanders, he is indeed a delighted person. Sometimes the dressy one binds puttees about his spindleshanks, wearing a pair of heavy boots. But more often sandals, or bare feet, are preferred.

The Rajah's "sais" is dressed in much the same way, only there is rather more of it. The crest and the turban are larger, the coat is gaudiness personified, and, on state occasions, a belt of gold braid is sported. Inyat Ali carries a yak's tail fly-whisk, with which to "brush away the blue-tailed fly," and he assumes a most haughty bearing—as becomes a potentate's menial. The domestic positively exudes pride of place.

During the most trying part of the "hot weather" the "sais" exchanges cloth for linen. The crest is retained, and so is the "cummerbund"; but the "chupkun" is adapted to the appalling temperature. Still, Inyat Ali, though robbed of his fine feathers, cuts an engaging figure.

"Buksheesh"

The "sais," while bitterly lamenting the part which the "bearer" plays in the purchase of grain and other provender, is not left out in the cold. For when the monthly bills are settled, he benefits at the blacksmith's expense. . . . "Your work, O shoer of my Lord's horses, is far from being satisfactory. The shoes of those which you shod but two days ago already are loose." . . . "Impossible, O particular one. During these three months have I worked for your Lord, and never has he complained." . . . "But he will, O most dense of shoers, unless you pay me a commission on all that you have received from him." . . . "I am poor, O exacting one; my family is large; I can not afford more than an eighth of my earnings." . . . "I must have a quarter, O mean one, or with these pincers I shall pull out a nail here and there." . . . He pays.

Inyat Ali also extracts a trifle from the mender of saddles, bridles and harness, and from the "bazaar" merchants who deal in cleaning materials, currycombs and brushes. He fleeces the carriage-builder who repairs the "Sahib's" pony cart, and upon a horse being bought from a native dealer a commission changes hands. The "hug" may amount to a tidy sum. Recently, a cavalry officer, visiting the Arab stables at Bombay, gave four thousand rupees for two polo ponies. Five per cent stuck to the "sais'" itching palm.

"Dustoori" is part and parcel of India.

Every native connected with a stable expects to make something over and above his wages; and if those who are fleeced at first demur, they eventually pay up. Mahometans and Hindus alike yield to the inevitable. Which, after all, is wise of them.

A Pension for the Deserving

After sixty-five the "sais" is not of much use, except for pottering around about the stables and giving advice. If, however, Inyat Ali has been many years in the "Sahib's" service, he is pensioned by his benevolent employer. On the first of every month he totters into the "presence," to receive a little bag of rupees, and when "Master," retiring, leaves India for good, arrangements are made with the bank to continue payment of the gratuity. Truly, a kind-hearted "Sahib."

Before touching the money the old man must be photographed, in order that the bank manager may, by comparing the picture with the original, satisfy himself that the right person is being paid. But Inyat Ali does not at all like being photographed; he believes the camera to be the outcome of witchcraft. The native (to whom a photograph conveys nothing) also is under the impression that he will be taken standing on his head; and that is very upsetting to a "sais'" dignity. Even though money is at stake, he thinks twice before submitting.

Upon the beneficiary's death, an enterprising relation, by arrangement with a clerk in the bank, may successfully claim the dole—till he is found out. Anything to gain the coveted rupees. . . .

Poisonous Plants

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NUTTALL'S DEATH CAMAS (ZYGADENUS NUTTALLII) AS A POISONOUS PLANT

DR. C. DWIGHT MARSH, A. B. Clawson and Glenwood C. Roe in Bulletin No. 1376, United States Department of Agriculture, have published an interesting account of Nuttall's death camas plant (Zygadenus nuttallii). This plant, a member of the lily family, occurs from Kansas to Arkansas, Oklahoma and Texas. Little had previously been known concerning the poisonous nature of this plant. Its poisonous nature was reported by Dr. L. J. Allen, Dr. Hiatt, and later by Dr. C. Dwight Marsh. Dr. C. G. Lloyd, writing in the American Druggist in 1887, states:

"I find it to be a powerful narcotic poison. One of my patients, a girl 8 years old, claimed that she only broke the stem of the plant and rubbed the juice on her lips and lapped it off with her tongue. Severe convulsions followed, lasting one and one-half hours, the most violent that it has been my lot to witness in a practice of 35 years; 24 hours later she had one of an hour's duration. I gave strong coffee from the start, used the bromids and gelsemium, stood over the patient three days and nights constantly. I write this that you may know there is a potency here not often met in the vegetable kindom.

"Symptoms.—Extreme thirst, constant vomiting, dilatation of the pupil and coma, and (sequel) inflammation of the stomach.

"One young lady, not included in the above, says she tasted the plant and it made her very sick; she also states that the taste was fascinating and followed by a desire for more, and that it required all her will-power to resist."

"Zygadenus nuttallii.—The stems are stout, 1 to 2 feet high; the bulbs are ovate. The leaves are from 4 to 20 inches long, one-fourth to three-fourths inch wide, and somewhat curved; the upper leaves are shorter and the lower are sheathed at base. The flower clusters are simple or branched and rather densely flowered. The flowers are whitish or yellowish; the bracts are about

the length of the pedicles and are narrow and thin; the flower segments are from one-fourth to three-eighths inch long and free from the seed pod; the glands are roundish and rather ill defined; the stamens are somewhat longer than the flower segments. The seed pods are about one-half inch long, three beaked, and three celled, splitting along the juncture of the cells. The seeds are numerout, flattened, and about one-fourth inch long."

The writers report the symptoms, as determined in a large number of animals experimented with, as follows:

"Salivation.—Salivation is very nearly a universal symptom of the poisoned animals. This was noted in three of the seven experimental cattle and in all but two of the experimental sheep. In most cases, this is the first evidence of intoxication.

"Nausea.—Nausea is almost invariably present and is frequently accompanied by vomiting. Vomiting was exhibited in all the cattle but in only two of the experimental sheep. In many cases the vomiting occurs not only once but repeatedly.

"Depression and weakness.—In mild cases the animals show only depression. When the illness is more pronounced it is accompanied by weakness which is especially noticeable in the hind legs; in the more severe cases the animals stagger when attempting to walk and may sometimes be unable to rise. In the worst cases it culminates in coma, which may continue for a prolonged period before recovery or death.

"Temperature.—In most cases of both cattle and sheep, the period of poisoning is one of definite low temperature. This is particularly marked in the case of the sheep. The temperature is not extremely low, but is distinctly below normal and rises again with the recovery from the illness.

"Pulse and respiration.—In most cases the pulse is weak and more or less irregular. The rate varies, but ordinarily is not rapid for any prolonged time. The respiration is distinctly irregular. This irregular respiration, in severe cases, is accompanied by grinding of the teeth and groans.

"Effect upon feces.—There is not, in all cases, any marked effect upon the excreta. Sometimes, however, the feces are soft and contain more or less mucus.

"Anorexia.—As would be expected in all severe cases, there is a more or less complete loss of appetite."

No remedy is known. They conclude:

"Nuttall's death camas (Zygadenus nuttallii) has not been recognized hitherto as a stock-poisoning plant. It appears that it has occasioned considerable losses of cattle in parts of Oklahoma, and probably it is the cause of many unexplained cases of sickness and death in the regions where it is found.

"The symptoms of sickness are like those produced by other species of death camas.

"It is even more poisonous than the western species which have been the subject of study.

"There are no effective medicinal remedies, but losses may be lessened by keeping animals, so far as possible, from the plant, and giving proper attention to sick animals."

MALLOW POISONOUS

Dr. James H. Hester, of Santa Barbara, California, writes as follows:

"I have your Manual of Poisonous Plants and find great benefit from a study of its pages. I also keep close watch for your splendid articles on poisonous plants which appear in Veterinary Medicine but I have been able to find very little concerning our common Malva plant. It has occurred to me that probably a copy of a letter which I furnished the American Veterinary Review about twenty-five years ago might be of interest to you.

"Our drought of 1898 and the winter following furnished an opportunity for studying the effects of this plant that is seldom equalled, as it was the first feed available and furnished the greater part of their feed for several weeks until the later pasture grasses came on."

The article appearing in the Veterinary Review, many years ago, will be of interest at this time. It is as follows:

"Is the common Malva plant (Malva

borealis) which grows so extensively upon the cultivated and pasture lands of the Pacific Coast ever injurious to stock?

"Scientific botanists say no, it cannot be for it belongs to a harmless natural order of plants.

"The Department at Washington in reply to my inquiry stated that the only previous intimation of such a suspicion that had been reported to them had been from a veterinarian in Arizona.

"The majority of stockmen will look at you in amazement when such a question is proposed because they know that stock of all kinds eat it readily and seem to thrive upon it when other green feed is scarce.

"But some of the more observing stockmen, and especially the butchers, while admitting that stock will thrive upon it, claim that if stock have been feeding upon it for some time are called upon for any unusual amount of exercise, symptoms of a sort of nervous collapse are liable to develop suddenly and if the affected animals are urged on they are liable to go down and probably never get up.

"During our drought of a few years ago, pastures were dried up, feed of all kinds was scarce and high priced. When the rains came Malva was the first vegetation to spring up and soon furnished almost the exclusive food for a large portion of our stock. When the time came to put the horses to work, the alarm was sounded that some new disease was prevailing among the horses of this locality from the effects of which a number had died. Horses that seemed all right when harnessed in the morning would give out and go down while at work. Colts that were being transferred from one pasture to another a few miles distant went down on the road.

"Investigation showed that the same symptoms developed in cattle when called upon for unusual exercise. My first experience was for a patron who owned a number of horses and was depending upon green feed, which was almost exclusively Malva to support them. He had caught up four head and brought a moderate sized load to town, a distance of about three miles. Upon arrival, noticing that one horse was sick, he drove at once to my place. When I went out the animal was standing in a team with head down, legs braced, muscles all quivering, the respirations quick and shallow. In fact, presented a case that might easily have been mistaken for a case of acute indigestion. We had to go about four blocks to the stable. I was fearful that she would go down before we could get there. Imagine my surprise on seeing her grab a mouthful of hay as she staggered past the manger into the box stall where she dropped down, heaved a big sigh, just as a person will do when exhausted, and began munching away at the hay. I gave her a dose of eserin and pilocarpin. She soon seemed to be getting easier and I left, returning in about one hour and a half. I found her standing at the rack eating hay, the medicine having operated.

"This same patron had a similar case a few days later. I was out when he called. The horse was left at the stable without any treatment with orders for me to attend to it as soon as I arrived. It was about one hour and a half later when I returned and found the horse standing at the rack eating hay, apparently as well as the one I had treated. I made up my mind that I had something new to deal with so set about investigating it.

"The same owner had other horses affected later and found that if they were allowed to stop and rest as soon as the first symptoms appeared they would soon recuperate, while one or two that were taken on the road home and that he urged on endeavoring to get home, went down and took several days to recover. From what I could learn in all cases where death occurred the animal had been urged until it collapsed and went down.

"Since that time I have been always on the alert for information concerning the effects of feeding Malva. I have met a number of stockmen who have noticed the same effects that I have mentioned and I have met with several cases that I have diagnosed Malva poisoning, and later, investigation proved that in each case the animal had been sub-

sisting largely upon Malva for some time. With a complete change of feed it requires some time before the animal ceases to show the effects of the Malva when called upon for unusual exertion."

It is true that our cattle and sheep do feed upon the common mallow, cheeses (Malva rotundifolia), and it is also true that the mucilaginous substance of this plant is harmless, but there are a few that have some toxic properties.

PLANTS SUSPECTED OF POISONING CATTLE

Dr. P. F. Runyon of Freehold, New Jersey, writes as follows: "I am forwarding you via parcel post some weed specimens. Have had some trouble with some young cattle pastured in a wood lot. Deaths were very sudden, found nothing pathological on postmortem. Will you kindly give me your opinion on these weeds?"

Dr. Runyon has sent a large number of plants which I have identified as follows: (I am listing these plants by families):

Sunflower family (Compositae): Boneset (Eupatorium perfoliatum), yarrow (Achillea millefolium), goldenrod (Solidago), aster (Aster sp.), horseweed (Erigeron canadensis).

Dock family (Polygonaceae): Curled dock (Rumex crispus), sheep sorrel (Rumex acetosella), mustard family (Cruciferae), pepper grass (Lepidium apetalum), winter cress (Barbareae vulgaris).

Buttercup family (Ranunculaceae), common buttercup (Ranunculus abortivus), carrot family (Daucus carota).

Purslane family (Portulacaceae): spring beauty (Claytonia virginica).

Jewel weed family (Bolsaminaceae): jewel weed (Impatiens fulva).

Figwort family (Scrophulariaceae), butter and eggs (Linaria vulgaris).

Lily family (Liliaceae): common wild lily (Lilium canadense).

Elderberry family (Caprifoliaceae): red berried elder (Sambucus racemosa).

Evening primrose family (Onagraceae): evening primrose (Oenothera biennis).

Only a few of the plants sent are suspected of being poisonous. Of the sunflowers, the boneset is not poisonous, although used in domestic medicine. It is related to white snake root, which is poisonous. The common boneset which grows in low grounds contains several glucosides. They are cathartic and emetic. Yarrow, though sometimes thought to be poisonous, is not strongly so. It has a decided action on the blood vessels in contracting hemorrhages. The other plants of the family are not poisonous.

The two members of the dock family, curled dock and sheep sorrel, should be regarded as poisonous, although stock usually avoid eating these plants. Both of these plants are rich in soluble oxalates and several reports indicate when eaten in considerable quantities are injurious. The two mustards are not strongly poisonous. The buttercups are all acrid poisonous plants, some cause blistering. The wild carrot is probably not injurious. Spring beauty is not poisonous. One species in California is known as miner's lettuce, because used by the miners as greens. Jewel weed has been suspected of being poisonous, but the evidence has not been supported by experiments and investigations. Butter and eggs belongs to a family of plants with a great many poisonous species; some like the fox glove are powerfully toxic. The plant has yellow flowers, and a very disagreeable odor. This plant contains a glucoside, linarin, and is regarded as suspicious. Stock usually avoid the plant. The red berried elder plant is most suspicious. The poisoning from these resembles that of Cicuta. An interesting case of poisoning was reported by Dr. F. Coville, and others, as follows:

"Our most direct evidence bearing upon the poisonous character of the elderberry root rests upon a case which occurred in the spring of 1894, at the Insti-

tution of Mercy, a Roman Catholic institution for children at Tarrytown, on the Hudson, and which attracted a great deal of attention at the time in the public press. The grounds of this institution were comparatively new, and ditching and fencing were still in progress at the time stated. A workman in digging a drain, uncovered a large number of roots to which the children took a fancy, and which they began eating. Within a very few minutes, and while still engaged in eating, a large number of the boys were seized with convulsions and several of them died. One of them had the remainder of the root, the marks of his teeth upon it, still clutched in his hand after death. The symptoms correspond in most features to those of the Cicuta poisoning above described and to that agent the accident was ascribed in the public press."

There remains another plant, namely, the evening primrose. The leaves, fruit and stem contain a great deal of needle shaped crystals, consisting of calcium oxalate. Certainly the plant is acrid, and no doubt might produce injurious symptoms.

The Relation of Wild Animals to Certain Diseases of Man*

P. H. MANSON-BAHR, C.M.G., M.D.

IN THE HIGHLY civilized state to which the majority of mankind has attained at the present day it is only in the tropics, where he still exists in a more or less primitive state, that an intimate contact with the indigenous fauna is possible; and it is therefore mainly in tropical countries that we find him a prey to disease germs which normally infest wild animals. Probably, at one time, some of these parasites were more widely spread than at present; but the exact manner in which they originated still remains a matter for speculation. It is probable, too, that primarily their virulence was much greater, but that, in process of time, each species of animal became tolerant of each particular parasite, so that eventually a state was attained in which host and parasite existed on terms of harmony; this is a condition such as we understand by the "reservoir" state; but it is one in which the parasite retained its virulence for non-immune individuals.

There is hardly a subject which so strongly supports the Darwinian hypothesis of the origin of man as this, and it is one which Darwin himself, had he been familiar with the details, would doubtlessly have exploited to the full. That man is in fact but part and parcel of the great scheme of nature and heir to the parasitic infections of animals around him, and a victim to parasites which fulfill their purpose by destroying or checking the numbers of immigrant species, appears to us now to be a self-evident fact.

For the passage of these disease germs from one host to another prolonged and intimate contact is necessary, but when once this chain of contact is broken, the parasite is no longer able to attain the different stages necessary for its evolution and must perish. But in the process of civilization certain animals such as the ox, the pig and dog, have during domestication inherited diseases from their wild ancestors and have continued to transmit them to man, who in turn has become, in some cases, the necessary intermediary host. The theories as to how these disease germs arose in the first instance, and how they became adapted to man, we will discuss at a later stage.

Rat-bite Fever

This is a worldwide disease, but it appears to be specially common in Japan.

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Following on the bite of an infected rat, sometimes after a prolonged incubation period, a lymphangitis supervenes which implicates the glands of the area involved. Then follow many short attacks of fever coinciding with an exacerbation of local symptoms.

The organism, Spirillum minus, was formerly thought to be a spirochete, is very minute, 1:5u to 6u in length, and can be found in the blood, as well as in the lymphatic glands, during the height of the disease. This fever is transmitted by the brown rat (Rattus rattus and Rattus alexandrinus), and the organism is probably identical with Spirillum laverani and with Spirillum muris, which are commonly found in the blood of rats and mice. It is said that the disease can also be conveyed by the bite of a ferret or by that of the domestic cat. The wild cat has also been incriminated. Felis catus, Linn, is said to still exist in the Highlands of Scotland in a purely wild state, but this statement is doubted by many authorities, as it appears to have intermingled with the house cat wherever that familiar animal has penetrated.

Rocky Mountain Spotted Fever

This is not a disease of the tropics at all; it is, however, peculiarly associated with the presence of wild animals. A typhus-like disease with a high mortality rate has long been known as "spotted fever," "blue disease," and "black fever;" and to be endemic in limited districts of Montana and Idaho and Wyoming. It has also been reported from the States of Utah, Nevada, Oregon, Colorado, and Washington. This fever is virulent, especially in the spring months of the year in the district of Montana known as the Bitter Root Valley. The causative organism belongs to that rather nebulous group, the Rickettsia, and is known as Dermacentoxenus rickettsi. It is conveyed by the bite of a tick peculiar to that region, known as Dermacentor venustus. It is only the adult tick that attacks man, but it commonly infests the Rocky mountain goat, the badger, lynx, bear, coyote, and other animals that inhabit that region. The larval and nymphal stages of the tick develop principally on the ground squirrel (Citellus columbianus) and the woodchuck (Marmota flaviventer nosophora, Howell). The last two rodents are considered to be the main reservoir hosts of the Rickettsia and, although a certain proportion are capable of infection in the laboratory, it is thought that they may develop the disease in a mild form under natural conditions. Of the larger animals the tick most favors the Rocky Mountain goat (Oreamnus montanus). It is not really a goat at all, but is most nearly allied to the serows, a rare animal at the present day, as it only exists where strictly preserved. The American badger (Taxidea taxus) resembles its European relative, with the difference that its diet is more carnivorous. The black bear (Ursus americanus), and the lynx (Lynx uinta) hardly call for comment. The coyote (Canis latrans, Say) is a small slinking wolf-like creature which differs from its European congeners in living in burrows in the plains.

The Columbian ground squirrel (Citellus columbianus Ord), is closely allied to the chipmunk, and is an intelligent little creature like its near relative; it lives amongst the birchwoods, where it digs its burrows in such a manner as to avoid attracting the attention of its enemies. In order to do so it removes the earth in its check pouches and carries it to a considerable distance. In winter the ground squirrel hibernates and in this state it probably harbors the virus of Rocky Mountain fever, so that it is able to convey the disease shortly after its spring awakening.

The woodchuck (Marmota flaviventer) is really a marmot, about 2 ft. in length; it is a thick-set creature with short legs and a stout bushy tail. It is grizzly or yellowish-grey in colour and hibernates all the winter long. Being vegetarian in diet, it lives in woodlands, never in the open plains, and is said to be the least industrious of all animals, to show energy only when digging its burrows, which may be 50 ft. or more in length.

Plague

Plague is essentially in the first place a disease of rodents and not of man. As Ma-

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carthur has so lucidly pointed out recently, much suffering would have been saved in the City of London had this been recognized in the Middle Ages.

Although the rat is the main reservoir of plague, many other rodents in many other parts of the world play a not inconsiderable part.

There are, as is well known, two species of domestic rat, of which the black rat (Rattus rattus Linn.) is the more important in the spread of the disease. The old English rat, as it is called, is rapidly vanishing from this country, being ousted by the more virile North European species (Rattus norvegicus, Berkenhout), which was apparently imported into Western Europe in the year 1716 as a result of a visit by the Russian Fleet. The black rat in India, in Burma, and in fact in the tropics generally, lives more closely in association with man; it is essentially an arboreal or climbing animal and rarely burrows; hence, when it infests buildings or huts, it is found in usually the walls, ceilings or roof. It drinks little and seldom enters the water voluntarily and it is the common rat on ships. In most cases it reaches or leaves the ships by clambering along the cables whilst the ships are in dock. Its dietary consists mostly of grain, and it is a much cleaner feeder than Rattus norvegicus. In appearance it differs also from norvigecus in its more slender build and large transparent ears. The weight of the adult is 8 oz.

There are several races of Rattus rattus which have been distinguished. One variety with reddish-black and pure white underparts is known as Rattus rattus frugivorus and is common in the Mediterranean area. The Alexandrine rat (Rattus rattus alexandrinus), with brownish-grey back and dingy colored abdomen, is found in Asia Minor and North Africa. Rattus rattus rufescens is the common Indian house rat and is distinguished by its smaller size, its long tail and the spinous hairs with rusty tips on its abdomen. These rats breed throughout the year, gestation lasting twenty-one days, the average litter being five or six.

The brown rat (Rattus norvegicus) is distinguished by its larger size, its heavier and clumsier build and by its blunter muzzle. The ears are small and opaque the tail noticeably shorter than the head and the body. The weight of the adult is about 17 oz. This rat is now developing a melanistic or black variety which was originally described in Ireland. Its home was originally temperate Asia. It is a water-loving and burrowing animal and is consequently far less agile than the former species, but it is far more voracious and cunning and is possessed of greater strength and fecundity. Usually exhibiting a shyness of man, it is under normal conditions a less important carrier of plague than is Rattus rattus. Rattus norvegicus is a very rapid breeder, the litter varying from six to twenty-three, the average from eight to ten.

In various parts of the world other rodents are capable of replacing the rat in the spread of plague. In California, McCoy has shown that the Californian ground squirrel plays an important part, and that the plague bacillus is transferred by the flea (Ceratophyllus acutus) to rats and so to man. This ground squirrel (Citellus grammurus beecheyi, Richardson), is in reality a spermophile and lives in burrows. In Southern Russia and the Caucasus other ground squirrels (Citellus) are said to carry plague. These rodents are really a connecting link between the squirrels and the marmots. They are generally to be found in prairie-like regions, where they form an intricate system of burrows, at the mouth of which they are commonly to be seen standing upright and motionless. The common European species is Citellus citellus Linn., and is known in Russia as the "suslik." In Mongolia a subspecies known as Citellus dauricus plays a similar part. These animals hibernate throughout the winter and are responsible for the summer outbreaks of pneumonic plague in Mongolia and Manchuria. In these regions, too, the common house mouse, Mus musculus, is held to be responsible for winter outbreaks of plague, though it does not appear to play a dominant part in other regions. In North China, Siberia and Manchuria the Mongolian marmot or "tarabagan" (sometimes called tarbagan,

or sarabagan (Marmota bokak, Müller) has been held to be responsible for many serious outbreaks of pneumonic plague. These marmots are of a large size and strong build. They are characterized by the rudimentary character of the thumb, their small eyes and ears; the tail is bushy and comparatively short. In length (exclusive of tail) they are 15 to 18 in., and 9 to 12 lb. in weight. They make large, deep and intricate burrows where they hibernate. The mounds of earth thrown up by generations of tarabagans are known as "bootans," and are characteristic of the region they inhabit. The flesh of the tarabagan is eaten by the Mongols, or "Buriats," and its fur is in much demand, being sold after drying and curing as imitation sable, or seal. This creature is credited with the faculty of harboring the plague bacillus in its body during hibernation, and thereby causing outbreaks of pneumonic plague amongst the hunters, who live under miserable conditions huddled together in underground hovels during the autumn and winter. The "Buriats" are said to be well aware of the danger of handling sick tarabagans, the infected animals being recognized by ceasing to bark and by being ejected by their healthy companions when they attempt to crawl back into their burrows.

In India, besides the rat, an insectivore, the musk shrew, Pachyura cærulea, plays a part in conveying plague. This shrew is about 6 in. in length, with a tail of 3½ to 4 in. It is colored uniformly with a bluish-ash or pale grey hue, slightly tinged with red, the naked parts being flesh colored. Commonly called the "musk rat," it frequents houses at night time, running about the rooms hunting for cockroaches or other insects, and uttering, while so doing, a sharp, shrill cry. It is popularly believed in India that the musky odor emitted by this shrew possesses such volatile and penetrating powers that it will actually permeate the cork of a bottle and taint the fluid within.

The bandicoot rat (Bandicota gigantea) is also susceptible to plague. This is a large rat 15 in. in length, with a tail of 13 in. and weighing about 3 lb. when fully adult. The incisor teeth are peculiar, being olive green at their base and yellow at their extremities. It is a well-known rat throughout India and Ceylon; being of a large size it shows fight when cornered and grunts like a pig. Where European gardens are cultivated, as in Newera, Eliya, Ceylon, it causes considerable damage amongst the potatoes and peas.

In South Africa, plague has spread amongst a number of rodents. When first introduced in 1901 it was apparently confined to the domestic rats. Further outbreaks in 1903, 1914 and 1918, led to the suspicion that other rodents were concerned. Some of them are responsible, as is the Cape hare, for transmitting the infection over a considerable area, but the chief part is played by small rat-like animals known as the gerbilles; of these there are numerous species in South Africa.

The first is known as Lobengula's gerbille, Taterona lobengulæ. Gerbilles are distributed all over South Africa south of the Sahara. They are all very closely related and are probably equally susceptible to plague. This particular species has been singled out by the health authorities in South Africa. It receives its specific name because it inhabits the former territory of Lobengula, the Matabele king. It is about 5½ in. from the nose to the root of the tail, the latter being 1 in. longer than the body. The fur is light fawn on the back, finely grizzled with dull black; the sides are pale fawn, the under parts are white and strongly demarcated. Although a gerbille, this particular species has the habit and structure of a rat. Other species probably involved are known as the Cape gerbille (Taterona afra) and Brant's gerbille (Taterona brantsi).

The white-nosed rat (Rattus coucha), sometimes called the multimammate mouse, is in appearance something between a rat and a mouse, and living in close association with the gerbilles, it is also frequently attacked by plague. This species is distributed throughout South Africa, and its range extends beyond the Equator to the Sahara. It is found in situations which afford abundance of cover, such as thick scrub. It is a house dweller and is often trapped in buildings and

outhouses. The tip of its nose, as its name indicates, is white.

The Springhaas, or Cape jumping hare (Pedetes caffer), is a much larger animal, the size of a rabbit, and by far the largest of the jerboa family. It is common throughout the Cape Province. It is sociable in its habits and forms an intricate series of burrows in which a good many families take up their abode. When alarmed and travelling at full speed, it races like a kangaroo, each leap covering 8 or 9 ft. It is nocturnal in its habits and multiplies very rapidly. It has many natural enemies and is preyed upon by the Cape eagle owl. This species can travel twenty to forty miles in a single night; on this account it is of importance in the spread of plague.

Carnivores which prey on these rodents, especially when sick, such as the yellow mongoose (Cynictus penicillata) and the suricat (Suricator suricator), are also found to die of plague; when the feces contain the remains of gerbilles, which they feed upon only when they are sick, it is taken by the health authorities as an indication that plague is endemic in that particular area.

In Senegal and West Africa a shrew (Crocidura stampflii) is said to play a part in the dissemination of plague. It lives in native houses and probably has much the same habits as those of the Indian musk rat and plays a similar rôle.

In England the rabbit and hare were found naturally infected with plague in Suffolk in 1910.

Tularemia

Tularemia is a plague-like disease which has been known since 1912 to affect jack-rabbits and other rodents, especially ground-squirrels, in California. Unfortunately it is communicable to man, in whom it causes an intractable illness.

Tularemia in man is a disease of the rural population, particularly in field workers, and is recorded amongst dealers who handle infected jack-rabbits. The organism, Bacterium tularense, is not easy to cultivate on artificial media: it is extraordinarily infective and many laboratory workers have contracted the disease. The infection is transmitted, from one infected jack-rabbit to another, by a bloodsucking fly, Chrysops discalis.

The jack-rabbit (Lepus campestris, Bachman) is a very familiar species in America. It is a large hare-like creature with long hind-legs and ears. In the northern parts of its range its coat turns white in winter, but further south this change is partial, or does not occur. Like our hare, it lives in the open and depends for safety on its protective coloration, speed and acute hearing. For its home the jack-rabbit has an open form beneath a bush or clump of weeds. Large numbers of these animals are killed annually in drives, as many as 20,000 having been accounted for in one day.

The ground-squirrel (Citellus grammurus beecheyi), which also forms a reservoir of infection, is the same species as that concerned in the spread of plague in California.

The gophers (Geomyidæ) form another source of infection. These are curious little animals, characterized by large cheek pouches opening ouside the mouth, and they have feet with immense claws for digging. Their bodies are heavy and their movements slow and clumsy. Their habits are nocturnal and they live in communities in burrows. Thomomys bottæ bottæ (Eydoux and Gervais), which extends along the coastal region of California, is the species concerned.

Note: The author also discusses trypanosomiasis in Africa and South America, leishmaniasis, Weil's disease and infections with leptospira and melioidosis, which have been omitted here, since at the present time these diseases are only of limited interest to veterinarians in this country. A list of helminthic parasites found in man and wild animals and an extensive reference to the literature on the subject, which accompany the original article, have also been omitted.

Poultry that are properly housed and fed are as profitable as other livestock.

Black nightshade (Solanum nigrum L) is an occasional cause of poisoning and loss of barnyard fowls.

Although blackhead or infectious enterohepatitis is caused by a protozoan parasite, the occurrence of the disease is intimately associated with the cecum worm (Hetarakis gallinae).

Technic of Hog Cholera Vaccination*

D. E. TRUMP, Utica, Nebr.

ONLY THOSE POINTS that are important in the handling of pigs before and after immunization will be discussed.

It is of prime importance to always carefully investigate the swine to be immunized, noting their physical condition and ascertaining whether or not the hogs are infested with ascarids or affected with necrotic enteritis, or any other diseased condition. In those cases in which it is necessary to immunize diseased herds, the client should be properly apprized of the condition and the possible outcome.

Vaccination should be done early in the morning while it is cool; however, in practice it is sometimes necessary to do this work at any time. The pigs should be prepared by having them placed in a pen the night before and if fed at all given only a light ration of oats. It is convenient to have a small catch pen six or eight feet square in one corner of the lot in which the hogs are yarded.

A hog crate or barrel with a scoop end gate is convenient for a table upon which can be placed all equipment. This table should be so placed that the operator can inject the pigs and fill the syringe without the necessity of moving. The catch pen should be bedded with dampened straw and one assistant in this pen should catch the pigs and hand them over the fence to a second assistant who grasps the pig by the forelegs and holds them with the venter surface toward the operator. Convenient equipment for doing this work consists of a field ice box which should hold 5,000 cc. of serum and sufficient virus. This box can be set on the table that has been previously covered with newspapers. It is generally found that the ice box appeals to the client and the newspapers are convenient for destroying any virus that may be spilled after the vaccination is completed.

Sufficient syringes that have been properly sterilized, should be provided, the type and size naturally depending upon the operator; three white porcelain pans, one 11x16x2½, and two 9x12x2½, are very convenient in which to keep solutions for the purpose of cleansing the syringes. The site of injection is sterilized by the application of tincture of iodin with a brush. In my vaccination, I prefer the axillary space. It has also been found that medium weight rubber gloves are convenient in the protection of the hands, and also appeal to the client as a safeguard against infection.

After the pigs are immunized they are placed in a dry lot, given a limited ration of oats and preferably pastured on a lot in which there is ample green feed. Such pigs should not be given a full ration for at least ten days after vaccination. After the vaccination has been completed all virus bottles and papers that were used in covering the table, are carefully wrapped and burned.

By following out the foregoing procedure, there will be less post-vaccination troubles, which, in turn, will signify increased vaccination for veterinarians.

*Given at Mo. Val. Vet. Ass'n. in Kansas City, Mo., July 27, 1925.

Dried powdered yeast in half-ounce doses, three to six times daily, has been found to be of value in treating dogs in the earlier stages of black tongue. The yeast may be mixed with the feed or given in capsule. Dried yeast retains its value as a curative for several weeks.

Is canine distemper a single disease, or may further investigations reveal the fact that at least some of the so-called forms or types of distemper are secondary infections or complications?

SOMNIFENE ANESTHESIA IN THE DOG*

A series of researches was undertaken at Alfort on the anesthetic value of various barbiturates of diethylamin. The following were studied:

(a) Diethyl-barbiturate of diethylamin (veronal). No anesthesia.

(b) Diallyl-barbiturate of diethylamin. Will produce anesthesia, but the dose approaches too closely to the toxic limit.

(c) A mixture of equal parts dithyl and diallyl barbiturate of diethylamin. Reported upon successfully by some authors. The narcosis was unduly and often dangerously prolonged.

(d) Allyl-isopropyl-barbiturate of diethylamin (somnifene). Very satisfactory.

Technic of Anesthesia

(a) About one-fourth hour before operation, give subcutaneously ¼ cgm. morphin per kilo body weight (3 cgms. for dog of 12 kg.).

(b) Inject intravenously in the saphenous vein 1/3 cc. of a 10% solution of somnifene for each kilo of body weight (4 cc. for dog of 12 kg.). Two or three minutes should be consumed in making the injection. Care should be taken that all of the liquid is injected in the vein.

Usually the dog is in deep anesthesia by the time all of the solution has been injected. Narcosis comes on promptly in all cases if the patient is not handled roughly or excited.

The period of narcosis lasts about twelve hours more or less. Too small a dose of somnifene (less than 1/3 cc. per kilo) will produce anesthesia, but there is a period of excitement which would be very marked if no morphin was used. With too small a dose a degree of excitement may last for hours. It is necessary to be sure that the dose is adequate.

The patient awakes gradually, showing motor incoordination, staggering and falling, but little by little regaining complete control. It is imperative that the animal be kept warm during the long period of anesthesia.

This method of anesthesia is truly ideal and much superior to all other methods now in use.

*Translated by Captain A. C. Wight, V. C. 12th Field Artillery, Fort Sam Houston, Texas, from article by Prof. Gabriel Petit and Dr. Regime Perlis in Recueil de Medecine Veterinaire, April 30, 1926.

The income from dressed poultry and poultry products is enormous. The sale of dressed poultry is proving very profitable in many locations. Dry plucking is advantageous in that the flesh retains its natural condition and is therefore more attractive.

Apparent normal development of chicken eyes that had been removed from 64- to 70-hour incubated eggs and placed in a medium composed of blood plasma of fowls and an extract of embryonic tissue, was demonstrated by two physiologists, Strangeways and Fell, at the Royal Society in London. The future possibilities of science no man can foresee.

Edema of the wattles in cockerels is a troublesome malady, particularly in exhibition birds. This condition can be overcome by cropping the wattles, and if this operation is done carefully, the losses will be prevented and the birds will not be disqualified for show purposes.

The administration from June to October of from one to two grams of dessicated thyroid gland for each kilogram of body weight will cause molting and depigmentation of the feathers of fowls. Will the administration of dessicated thyroid gland or thyroid extract facilitate shedding of hair in mammals? If such action follows, it would be of value in animals that do not shed properly.

Nasal granuloma is the name applied to a disease of cattle in India. This malady is marked by granulomatous formation that involves the nasal mucosa. The condition is apparently infectious. Granules similar to actinomyces are demonstrable in the granulomatous tissue and may be the causative factor. The disease

is characterized by a blowing or snoring noise due to obstruction in the nares. The percentage of fatality is not high, but the disease is of economic importance because of the loss of condition of the affected individuals.

GROWTH OF CHICKS AS AFFECTED BY SUNLIGHT

Within the last few years extensive investigations have been conducted with chicks to determine their nutritional requirements. All these numerous tests show that to safeguard against leg weakness, some material like cod-liver oil or egg yolk, rich in the anti-rachitic vitamin, or its equivalent, direct sunlight, must be supplied to insure success.

Cod-liver oil has been extensively employed with good results. Its use, nevertheless, has some drawbacks in that not all grades of this oil possess the same potency. Thus the poultry keeper has no direct assurance of procuring a highly efficient oil unless he obtains a product which has been tested for its anti-rachitic properties, for which he usually pays a premium.

Many poultry men have also inquired into the possibilities of using artificial sunlight as produced by the quartz mercury vapor lamp, or carbon arc lamp. Here again he is confronted with certain difficulties which virtually make the question of artificial sunlight impractical. Although he is probably aware of the beneficial effects of direct sunlight, he is at a loss to make use of this natural remedy at all times on account of the weather. He also has been instructed that window glass as ordinarily found in our homes and poultry houses filters out the effective rays of the sun. What, then, can he do to obtain the benefits of direct sunlight? Is there a possible substitute for ordinary glass? How about some of these glass substitutes that are on the market?

In order to answer the foregoing questions, with which we were confronted daily, an experiment was started to determine what the facts are.

On March 18, 1926, 300 week-old White Leghorn chicks, hatched from the Station's flocks, were divided into three lots of 100 each and placed in separate colony houses of 8 by 8 feet, with gas brooder stoves. In addition, each house was provided with a "sun parlor" 3 by 7 feet on the south side, which the chicks had access to during the day. The top of one "parlor" was covered with window glass, the second with one-inch poultry netting, and the third with "celo-glass."

The chicks were all kept at the same relative temperature and subjected to the same routine management. All three groups alike received a ground mash composed of yellow corn 70, wheat middlings 22, meat scraps 5, raw bone meal 2, common salt 1, and skim-milk ad libitum.

The chicks in all the groups grew at a normal rate to the fifth week when approximately one-third of those in the "window-glass" group showed signs of failure, attendant with a slower gain in weight. By the eighth week all the chicks in this lot, which was then discontinued, exhibited severe signs of leg weakness. The two other groups continue to make normal growth to the close of the experiment, or the 10th week, with no evidence of nutritional failure. No outstanding or apparent difference was noted between the group that had access to direct sunlight and the one which received sunlight filtered through "celo-glass." The chicks of both groups made excellent gains, reaching a weight of approximately 1.4 to 1.5 pounds per chick at 10 weeks of age.

Whether the chicks under "celo-glass" received all the beneficial effects of direct sunlight we are unable to state. However, from the data presented it would appear that enough of the effective ultra-violet rays were transmitted by the "celo-glass" to offer protection against leg weakness for a period of 10 weeks or longer. Further evidence is presented to show that window glass is ineffective in the transmission of the beneficial ultra-violet rays. This, in part, offers an explanation for soft shelled eggs, egg paralysis, and decreased egg production which result when laying flocks are deprived of the vital rays of the sun and no provision

is made in the ration to supply this deficiency.

The possible practical application of this or equally efficient glass substitutes are self-evident. It not only offers possibilities for protecting the chicks from unfavorable weather but also at the same time obtains some of the beneficial effects of direct sunlight. Although we have no direct evidence that similar beneficial results could be secured with laying flocks, we have reason to suppose that some improvement over window glass would result.—Bethke and Kennard, Ohio Experiment Station Bulletin No. 121.

INTERNAL PARASITES IN FOXES

During the past year a large number of fox ranchers reported losses among their animals, and the college laboratories received inquiries as to the causes of death and disease among foxes. Specimens were sent in for examination and diagnosis. This material varied from living foxes to the organs of dead animals. In many cases the cause of death was determined and reports and suggestions as to future care were forwarded to the parties concerned. A study of our records shows that distemper, dietetic diseases, and parasitic invasions are probably the most serious menaces the fox rancher has to deal with. The following note is based upon a study of the laboratory records for the past year, which show that parasitic invasions are very common among foxes. Indeed, much of the material forwarded to the college was feces from foxes whose owners suspected the presence of parasites in their animals.

The fox ranches from which the material was gathered are scattered over the province, so that the findings may be considered to be fairly representative of conditions throughout Ontario. Our experience has been that few samples are free from the ova of intestinal or lung parasites. Many ranches are badly infected and it is doubtful if there is any ranch on which a number of foxes are kept that is entirely free from parasites.

The control of internal parasites in foxes is a serious problem and one that may become more serious and demand closer attention as time goes on, because the longer infected foxes are kept in more or less confined pens the more contaminated with parasite ova will the earth of the pens become. Many adult foxes harbor parasites without any very serious consequences resulting. It is among the younger animals that the ravages of parasites are most apparent.

The fox is liable to become infested by several kinds of internal parasitic worms. In Ontario there seems to be three species of worms common to foxes. There may be only one kind of parasite infesting the animals on a given ranch, or, as frequently happens, all three kinds may be present. The three worms commonly met with are: (1) The round worms (Ascarides, Belascaris marginata, B. cati), (2) Hookworms (Ancylostoma caninum), (3) Lung worms (Eucolius aerophilus).

Of the above we have found the ascarides less frequently than the other two. This may be due in part to the fact that they are more easily expelled. It is also possible that the various medicinal remedies, commonly used by ranchers in an effort to control internal parasites, are more effective in expelling the ascarides than the other species.

Hookworms are very common and are responsible for intestinal trouble and often death, especially among young animals. The hookworm is very small and can easily be overlooked at postmortem.

Lung worms are most difficult to control. Up to the present time no medicinal agent is known that will eradicate them from the lungs. The best way to combat lung-worm infestation is to segregate infected animals and to gradually eliminate them from the ranch, at the same time using thorough methods to disinfect infected pens before other foxes are placed therein.

The parasites in question are spread from one animal to another by means of the soil that has become contaminated by the droppings from infected animals. It is probable that direct infection does not take place, as it is known that the eggs of most, if not all the internal parasites, must go through a certain development either in another animal, often of a totally different species, or

in or upon the ground. After a certain period the eggs or larvae, if swallowed by a suitable animal (in this case a fox), will develop into the adult parasite.

With these few facts in mind it can readily be seen that it is unwise for the fox rancher to rely exclusively on internal medication when fighting these pests. He must bear in mind that the soil of the pens is the abiding place of the eggs and larvae and must take measures to insure that these eggs and larvae are killed before placing clean animals in pens that have contained infested foxes. The eggs of the internal parasites will live for months in damp soil; freezing does not kill all of them, although, of course, low temperatures will inhibit or prevent development taking place for the time being, but so soon as warm weather comes development within the eggs begins. The best agents to make use of in cleansing the soil of parasite eggs and larvae are drying, sunlight, and quicklime, with constant stirring of the top layer of soil, or, better still, removal of the top few inches of earth from the run.

Pens that have contained infested animals should be kept empty for some months during the summer time. The eggs will not retain their vitality for long periods of time, but, to make certain, the pens should be kept empty for six months during summer, by which time it is probable that all the eggs and larvae will have perished.

The method used in the college laboratories for detecting the ova of the internal parasites in fox feces has been found to be satisfactory by many workers. The fecal matter together with a little water is well ground up in a mortar to about the consistency of thin cream. The mass is then passed through a wire gauze to remove grit and larger particles. About 8 c.c. of the filtrate is placed in a test-tube to which is added about 15 c.c. of ordinary glycerin. The fecal matter and glycerin are then very thoroughly mixed together, but not shaken violently, thus avoiding the formation of bubbles. The mixture is then centrifuged for two minutes or is allowed to stand for some hours, when the eggs will rise to the top of the liquid. A drop of the mixture from the very top is then placed upon a glass slide and is examined under the microscope, using the low power and reduced light. Any eggs present are easily detected, and, because of the differences existing between the size and shape of the eggs of the different species of parasites, it can readily be determined which particular parasite or parasites are infesting the digestive or respiratory organs of the fox in question. The eggs of the lung worms find their way into the intestinal tract in the exudates from the irritated lung that are coughed up and swallowed by the infested fox.

As to medicinal agents to remove worms from the digestive tract it has been demonstrated by many workers that oil of chenopodium followed by castor oil is an effective vermifuge for ascarides. For hookworms, carbon-tetrachlorid seems to be the best drug. Unfortunately carbon-tetrachlorid is quite toxic and must be given in proper doses, using capsules for its administration. The lung worms present the greatest problem, as no drug has yet been found that will remove them from the lung. Up to the present time hygienic methods are the best means we have of eradicating this pest.—H. E. Batt, B. V. Sc., Report of Ontario Veterinary College, 1925.

At the meeting of the International Congress of Plant Sciences at Ithaca, N. Y., in August, Dr. L. H. Bailey stated: "There are about 500,000 species of known and named higher plants. Of these only 10 per cent are cultivated, and out of this small fraction most species are cultivated only in an incidental way. Fewer than 100 species supply us with food, fiber and timber, the three great staples of our daily life. We have no reason to believe that the species now cultivated are intrinsically the most useful of those that exist. Some neglected weed, in the hands of a skilled botanist, may some day overturn all our agriculture. We have learned much about plants; yet know very little as compared with our ignorance about them."